

Светлана Новікава

СВЕТ МАТЭМАТЫКА ...

С. Новікава

СВЕТ

МАТЭМАТЫКА ...



Institute of Mathematics and Cybernetics  
Hierarchical Multilevel Systems Laboratory

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Светлана Новікава

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У кнізе прызнанага ў свеце беларускага матэматыка Светланы Новікавай упершыню сістэматычна выкладзена аэд-тэорыя (іерархічная матэматыка, тэорыя ведаў). Гэта першая тэорыя, здольная дакладна (матэматычна, фармальна) апісаць сістэмы ведаў: як традыцыйныя (мовы з іх граматыкамі, этнасы, грамады, культуру, мастацтва, законы, бібліятэкі і архівы, дзяржавы, светаглядзі), так і сучасныя (камп'ютарна-інфармацыйныя сістэмы і сеткі, тэхнічнае і мастацкае канструяванне, тэхналогіі, асвету, нацыі, навуку, матэматыку).

Для гэтага тэорыя ведаў прапануе ўласны матэматычны выраз, названы па-беларуску вед (па-элінску – аэд), здольны дакладна апісаць усе аб'екты, вядомыя ў сістэмах ведаў (фізічныя, хімічныя, біялагічныя, дэмаграфічныя, вытворчыя, творчыя, інфармацыйныя, матэматычныя), і выразы, якімі сістэмы ведаў азначаюць свае аб'екты.

Упершыню (ці больш эфектыўным спосабам) прапануецца рашэнне шэрагу канкрэтных задач: фізічных (іерархічная механіка, ядзерная арыфметыка, зорны сінтэз, апісанне хваль, цунамі, блакітны колер неба), хімічных (ядзерная геаметрыя), біялагічных (механізм інфармацыйнага працэсара ДНК у клетцы), ведавых (апісанне інфармацыйных рухаў у гуках і выявах, навуковага працэсу, канструявання, інавацыйнай дзейнасці), матэматычных (задач фармалізацыі іерархічных многаўзроўневых сістэм Месаравіча-Такахары, пазіцыйных лікавых сістэм, граматык натуральных моў, звязвання ў адзіным кодзе фармалізацый геаметрыі, кароткі доказ вялікай тэарэмы Ферма) і інш.

Іерархічная матэматыка (аэд-тэорыя) прапануе рашэнне асноўнай задачы тэорыі сістэм - стварэнне матэматычнага апарату, здольнага азначыць рэальныя сістэмы: тэхнічныя, прыродныя, ведавыя; абагульняе кібернетычную задачу канструявання, кіравання і асветы і прапануе яе фармальнае (агульнае) рашэнне; а таксама звязвае ўласнымі фармальнымі сродкамі вядомыя матэматычныя тэорыі з новымі матэматычнымі задачамі, пастаўленымі і вырашанымі тэорыяй ведаў.

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Aed-theory (hierarchical mathematics, knowledge theory, ved (wed, wedz) theory) is for the first time systematically presented in this book written by Svetlana Novikava – world recognized Belarusian mathematician, the author of aed-theory. Aed-theory is the first theory that is able to describe knowledge systems exactly (mathematically, formally): both traditional (languages with their grammars, ethnoses, communities, culture, art, laws, libraries and archives, states, world view) and modern (computer information systems and nets, technical and art design, technologies, education, nations, science, mathematics).

For dealing with this knowledge theory suggests its own mathematic image called “aed” by Hellenic (or “ved (wed, wedz)” by Belarusan) able to describe both – all objects known in knowledge systems (physical, chemical, biological, demographical, and knowledge (including engineering and mind activity), mathematics&cybernetics) and any images (signs, symbols, signals and other) used by knowledge systems for their subjects defining.

First or more effective the carrying out of some practical tasks is suggested: physical (hierarchical mechanics, nuclear arithmetic, star technology of nuclear synthesis, waves formal description, tsunamis, blue color of sky), chemical (nuclear geometry), biological (the mechanism of DNA informative processor in a cell), knowledge (definition of information acts in sounds and images, scientific process, design, innovative activity), mathematical (formalization of hierarchical multilevel system by Mesarovich-Takahara, position digital systems, grammars of natural languages; linking all geometry formalizations in a single code; short proof of the great Ferma theorem) etc.

Hierarchical mathematics (aed-theory) carries out the main task of systems theory: suggests mathematical means able to describe real systems: technical, natural, knowledge; as well as generalizes cybernetics task of design&control&learning and suggests its formal carrying out. Hierarchical mathematics also links (by own formal means) known mathematical theories and tasks with new mathematical tasks that are set and carried out by knowledge theory.

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# КАРОТКІ БІЯГРАФІЧНЫ АГЛЯД

Прапануемая кніга абагульняе вынікі аэд-тэорыі (тэорыі ведаў), напісана аўтарам аэд-тэорыі – Светланай Новікавай – выбітным беларускім матэматыкам і кібернетыкам. Прапануемая кніга надрукавана пасля смерці аўтара – у адпаведнасці са складзеным перадсмяротным планам.

Форма выкладу аэд-тэорыі цалкам перапрацавана аўтарам пры падрыхтоўцы гэтай кнігі. Пачаткова вынікі аэд-тэорыі атрымліваліся пры матэматычным апісанні яе сродкамі канкрэтных сістэм розных узроўняў: фізічнага, хімічнага, біялагічнага, дэмаграфічнага і ведаў (вытворчых і творчых сістэм). Аўтар меркаваў уключыць у кнігу ўсе вынікі тэорыі, падаўшы іх у новым ключы: як невялікі лік чыста матэматычных задач-схем, прыдатных для ўсіх узроўняў. У адпаведнасці з задумай тэкст кнігі мусіў выдавацца факсімільным спосабам. Аднак аўтар паспеў перапрацаваць толькі частку задач, пераважна фізіка-хімічных. Таксама былі перапісаны некаторыя задачы ўзроўню ведаў: апісанне навуковай дзейнасці, беларускага светагляду. Усе гэтыя задачы склалі першую частку кнігі.

У другую частку кнігі ўвайшлі артыкулы, у якіх засталіся важныя задачы, якія аўтар не паспеў уключыць у асноўны тэкст. Гэта пераважна задачы ўзроўню ведаў (уласна матэматычныя задачы) і два артыкулы 2008 года, у якіх уводзіцца новая (іерархічная) механіка. Усе дадзеныя артыкулы друкаваліся і абмяркоўваліся раней на самым высокім міжнародным узроўні.

Поўны спіс публікацый аўтара і яго вучняў па тэорыі ведаў змешчаны ў спісе літаратуры.

## **Асобныя біяграфічныя звесткі аб аўтары.**

Светлана Іванаўна Новікава (19.04.1947 – 01.07.2012), беларуска. Нарадзілася і правяла дзяцінства на Магілёўшчыне. Калі ёй споўнілася 14 гадоў, уся сям’я следам за рэпрэсаваным бацькам перабіраецца з Беларусі ў Сібір (г. Краснаярск).

У 20 гадоў скончыла матэматычны факультэт Краснаярскага ўніверсітэта. Першая яе праца (па тэорыі функцый многіх камплексных зменных), выкананая на першым курсе ў якасці курсавой, была надрукавана на ўсесаюзнай канферэнцыі ў час навучання.

У 1973 годзе вярнулася на радзіму, у Беларусь, дзе два гады працавала ў Інстытуце прыкладных фізічных праблем БДУ, займаючыся матэматычным мадэляваннем фізічных працэсаў.

У 1976 годзе перайшла працаваць у Інстытут тэхнічнай кібернетыкі АН БССР (зараз Аб’яднаны інстытут праблем інфарматыкі), у лабараторыю А.І. Семянкова (тагачаснага дырэктара Інстытута), дзе занялася кібернетычнай задачай канструявання. Сам А.І. Семянкоў праходзіў стажыроўку ў М. Месаравіча (Кліўленд, ЗША), аўтара тэорыі іерархічных многаўзроўневых сістэм. Адна з задач, пастаўленых А.І. Семянковым перад Светланай Новікавай, – стварыць аўтаматызаваную сістэму кіравання навукай.

З 1979 года, выявіўшы, што ні адна вядомая матэматычная тэорыя для вырашэння пастаўленай задачы не падыходзіць, Светлана Новікава пачынае ствараць новую тэорыю. Зыходным пунктам у яе доследзе сталі дзве працы: «Тэорыя іерархічных многаўзроўневых сістэм» М. Месаравіча, Д. Мака, Я. Такахары (1970 г.) і яе працяг – «Тэорыя агульных сістэм – матэматычныя асновы» М. Месаравіча і Я. Такахары (1975 г.). Апошняя з’явілася абагульненнем усіх вядомых матэматычных тэорый, аднак фармалізаваць іерархічныя многаўзроўневыя сістэмы тэорыя агульных сістэм так і не здолела. Гэта было зроблена Светланай Новікавай у новай тэорыі. Першыя яе крокі ў дадзеным напрамку – фармалізацыя двухузроўневых іерархічных сістэм, каардынатора і г.д. Далей ужо гэтымі сродкамі была фармалізавана навука і яе кіраванне, распрацавана структура і алгарытмы працы размеркаваных баз звестак, сканструявана і рэалізавана працаздольная аўтаматызаваная сістэма кіравання навукай для Акадэміі Навук БССР.

У 1985 годзе, скончыўшы аспірантуру ў Інстытуце тэхнічнай кібернетыкі, Светлана Новікава прадстаўляе на абарону дысертацыю з новым матэматычным фармалізмам, але атрымлівае адмову Навуковай рады з фармулёўкай «слишком тяжёлая математика – народу это непонятно», нягледзячы на наяўнасць мноства друкаў па гэтай тэме. Следам – другая дысертацыя па іерархічных сістэмах – і аналагічны адказ. Пазней, у 1990-я і 2000-я, гэтыя дысертацыі, перакладзеныя на беларускую мову, сталі тэарэтычнай базай у дысертацыях яе вучняў (Светлана Новікава выступіла іх навуковым кіраўніком).

Разам з тым, з 1985 года Светлана Новікава пачала актыўна друкавацца па тэорыі сістэм (датуль яна мела шмат друкаў па класічнай матэматыцы), для гэтага сабрала ў Інстытуце тэхнічнай кібернетыкі групу маладых навукоўцаў (8 чалавек) і стала яе кіраўніком. Вынікі групы друкаваліся на самым высокім на той час узроўні – саюзным – па 25 публікацый у год, што ў шмат разоў перавышала норму для цэлай лабараторыі.

У 1990 годзе адзін з артыкулаў Светланы Новікавай быў прыняты на цэнтральную канферэнцыю па канструяванні ў свеце – ICED (International Conference on Engineering Design) у Дуброўніку (Харватыя).

Больш за тое, Светлану Новікаву ўключылі ў аргкамітэт і абралі кіраўніком цэнтральнай секцыі – «Тэорыя аўтаматызаваных сістэм кіравання».

У 1991 годзе, пасля атрымання Беларуссю незалежнасці, уся група (усе 8 чалавек) звольнілася з Інстытута тэхнічнай кібернетыкі (у першую чаргу жадаючы атрымаць самастойнасць у навуковых і арганізацыйных пытаннях) і, знайшоўшы фінансаванне, перайшла на працу ў адно з беларускіх прыватных навукова-вытворчых аб'яднанняў. Такім чынам была створана адна з першых прыватных навуковых устаноў у Беларусі.

Гэта быў пачатак актыўнага друку і паездак на міжнародныя канферэнцыі самага высокага ўзроўню: ICED, IFAC (International Federation of Automatic Control), IEEE (Institute of Electrical and Electronics Engineers), кібернетычныя і матэматычныя кангрэсы.

У 1992 годзе Светлана Новікава зарэгістравала ўжо сваю навуковую арганізацыю – Лабараторыю іерархічных многаўзроўневых сістэм. Лабараторыя займалася беларускімі і міжнароднымі матэматычна-кібернетычнымі кантрактамі (уключаючы праекты Еўрасаюза). ЕС працягваў супрацоўніцтва з Лабараторыяй нават у перыяды санкцый, калі супрацоўніцтва з іншымі беларускімі навукоўцамі было спынена.

У 1997 годзе Светлана Новікава стварыла Інстытут матэматыкі і кібернетыкі (ІМК), зарэгістраваны як рэспубліканскае навуковае грамадскае аб'яднанне, членамі якога па яе запрашэнні сталі лепшыя навукоўцы Беларусі, прызнаныя ў свеце. З гэтага часу ўсе новыя вынікі Лабараторыі іерархічных многаўзроўневых сістэм публікуюцца сумесна з ІМК.

У 1998 годзе Светлана Новікава была ўключана ў кіраўніцтва IFAC, стаўшы членам тэхнічнага камітэта. Гэта быў той рэдкі выпадак, калі ў IFAC быў уключаны асобны даследчык, а не дзяржаўная ўстанова.

Светлана Новікава падрыхтавала цэлую плеяду маладых навукоўцаў, уваходзіла ў праграмныя і тэхнічныя камітэты вядучых кібернетычных арганізацый, атрымлівала запрашэнні стаць ганаровым членам замежных універсітэтаў і навуковых таварыстваў.

*Надрукавана паводле інтэрв'ю,  
дадзенага Светланай Новікавай  
А. Астроўскаму ў 2010 годзе*

# КАРОТКАЕ АПІСАННЕ АСНОЎНЫХ ВЫНІКАЎ ПРАЦЫ СВЕТЛАНЫ НОВІКАВАЙ

Асноўны вынік працы Светланы Новікавай, які прапануецца ў гэтай кнізе, – распрацаваная ёю тэорыя ведаў (аэд-тэорыя, іерархічная матэматыка), якая ўпершыню ў свеце дазволіла вырашыць некаторыя цяжкавырашальныя для традыцыйных тэорый і метадаў задачы матэматыкі і кібернетыкі:

- кібернетычныя задачы канструявання, кіравання і навучання, якія патрабуюць уліку будовы сістэм, адзінак, працэсаў (рухаў і дэфармацый), сувязяў, улады, лікаў (узроўняў, прасторы і часу) і мэты. Прычым усе гэтыя характарыстыкі павінны быць улічаныя адразу для некалькіх узроўняў: уласнага ладу сістэмы, сістэмы і яе навакольнага свету (суседніх сістэм таго ж узроўню), пануючых (утрымліваючых) сістэм і мэты. Для матэматычнага і кібернетычнага (камп’ютарнага) рашэння задач канструявання, кіравання і навучання згаданыя ўзроўні і ўсе іх характарыстыкі былі ў аэд-тэорыі фармалізаваныя (апісаныя матэматычна, лікамі) і фармальна звязаныя, што стварыла магчымасць разліку самой сістэмы – узгаднення ўсіх згаданых характарыстык, а таксама разліку змены ўсіх характарыстык сістэмы пры змене некаторых з іх (напрыклад, пры замене часткі, з’яўленні новых сістэм у наваколлі, змене мэты і інш.);

- матэматычныя задачы фармалізацыі (матэматычнага азначэння):

- а) іерархічных многаўзроўневых сістэм М. Месаравіча і Я. Такахары;

- б) пазіцыйных лікаў (пазіцыйнай лікавай сістэмы);

- в) натуральных моў (фармальныя граматыкі, прапанаваныя раней, апісвалі не натуральныя мовы, а толькі вонкава падобныя да іх фармальныя мовы (напрыклад, мовы праграмавання));

- г) задачы звязвання матэматычных кодаў у геаметрыі: эўклідавай геаметрыі, бэта-сплайнаў, канструктыўнай цвёрдацельнай геаметрыі (constructive solid geometry), сістэм няроўнасцяў. На практыцы і ў праграмаванні выкарыстоўваліся ўсе гэтыя фармалізацыі, але яны не былі звязаны паміж сабой. Гэта значыць, фармальны пераход ад адной фармалізацыі да іншай быў немагчымы, а значыць, немагчыма было яго аўтаматызаваць. У межах кожнага з падыходаў базісныя фігуры (прымітывы) немагчыма было звязаць у фігуры большага ўзроўню, з якімі было б магчыма апераваць як з цэлым;

- матэматычную задачу звязвання (азначэння адзіным выразам) прапанаваных фармальных выказаў між сабой і з усімі вядомымі матэматычнымі выразамі.

Аэд-тэорыя выкарыстоўвалася для вырашэння практычных задач: тэхнічнага канструявання (лазерных прылад, робататэхнічных сістэм, трактарабудавання, САПР, графічных інтэрфэйсаў, распазнавання тэксту і выяў, візуальнага кантролю на канвееры), апісання фізічных і хімічных сістэм і іх наступнага выкарыстання ў тэхніцы, дзяржаўнага канструявання і будавання, інавацыйнай дзейнасці, экалогіі і аховы здароў’я, манетарных сістэм і дакументазвароту, асветы, стварэння і ўладкавання ведаў (фальклорных ведаў, беларускіх суполак у свеце, культуры і мастацтва).

Выкарыстанне аэд-тэорыі для азначэння фізічных і хімічных сістэм дазволіла стварыць іерархічную механіку, здольную замяніць вядомую ньютанаву механіку з яе дапаўненнямі, максвелаву электрадынаміку і інш., і прапанаваць рашэнне шэрагу механічных задач. У тым ліку ўпершыню прапанавана апісанне фундаментальных (стабільных) элементарных часцінак (пратонаў, электронаў, фатонаў, пазітронаў, нейтрына) як станаў адной сістэмы (у вядомай фізіцы такая задача ставілася даўно, але задавальняльна звязаць усе згаданыя аб’екты ў адной тэорыі не атрымлівалася з-за вялізнай розніцы ў вазе). Новая механіка робіць гэта без увядзення дадатковых нестабільных ці прынцыпова неназіральных часцінак кшталту кваркаў. Прапанаванае апісанне прыдатна для азначэння працэсаў складання фізічнага (атамы), хімічнага (малекулы, у тым ліку – колавыя), біялагічнага (ДНК), інфармацыйнага (гукі і выявы) узроўняў.

Усё гэта дазволіла:

- даць новае апісанне ядзернага сінтэзу (зорнай тэхналогіі) і, з аднаго боку, стварыць падыходы да будовы новай перыядычнай табліцы элементаў і іх ізатопаў, а з іншага – даць новае тлумачэнне вядомых працэсаў тэрмаядзернага сінтэзу і адкрыць перспектывы стварэння новых эфектыўных схем тэрмаядзерных рэактараў;

- на новай аснове азначыць фундаментальныя (электрычныя, магнітныя, гравітацыйныя, цеплавыя) з’явы і іх узаемадзеянні, у тым ліку – інтэрф’ярэнцыю, дыфракцыю, відавое рэха (адлюстраванне), колер; зрабіць новае апісанне фатонаў, электронаў, пазітронаў, электрамагнітных хваляў, гукаў, выбухаў з улікам іх узаемадзеянняў;

- нанова азначыць хвалі і іх рух – з улікам новых адкрыццяў аб хвалях (перанос масы пры дэфармацыі), якія не маглі быць азначаны ў межах вядомых раней матэматычных выказаў для хваляў;



- упершыню апісаць механізм утварэння выяў і працу зроку на іх аснове;
- азначыць гукі, прапанаваць колеры гукаў;
- прапанаваць гукавы механізм працы нерваў і мозгу;
- упершыню прапанаваць матэматычныя выразы: руху цунамі і кіравання ім, тарнада, утварэння колеру неба.

Гэта кніга не вельмі даступная, бо стварэнне тэорыі ведаў (аэд-тэорыі) запатрабавала выпрацоўкі новых спосабаў выкладу. Матэматычнай падрыхтоўкі, якую даюць сучасныя ўніверсітэты, можа быць не дастаткова для разумення новай тэорыі. Па гэтай прычыне Інстытут і Лабараторыя рыхтуюць публічныя лекцыі, навучальныя курсы, інтэрнэт-лекцыі і курсы, якія дазваляюць атрымаць пачатковыя веды ў аэд-тэорыі, дастаковыя для наступнага самастойнага засваення гэтай кнігі і практычнага яе выкарыстання ў сваім прафесійным кірунку. Лекцыі праводзяцца з 2013 года. З 2014 года адкрыта міжнародная асветная праграма “Інфарматыка”, якая вядзе падрыхтоўку бакалаўраў і магістраў. Магчыма навучанне ў аспірантуры.

Атрымаць інфармацыю аб удзеле ў арганізаваных курсах і лекцыях, навучальных праграмах, магчымасці навуковага супрацоўніцтва, а таксама аб дадатковым накладзе, перавыданні ці перакладзе кнігі можна па наступных адрасах ці тэлефонах<sup>1</sup> :

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<sup>1</sup> To get more information about educational programs on aed theory, possible scientific cooperation, getting of this book additional copies, it's translation or reprint please contact: Paval Buka ntr.imc@gmail.com, +375 44 7049129, +375 17 2124296, Wladimir Novik vlad\_nov11@mail.ru, +375 29 5706267

Панове,

Я маю гонар прапанаваць матэматыку, аснова якой – гоман (гукавы і графічны) маіх дзядоў, Іліяда, Статут Вялікага княства (якім кіруецца ўвесь свет як матэматыкай). І матэматыка, якую я прапаную, зараз, яна

Ад роднае зямлі  
Ад гоману бароў,  
Ад казак вечароў,  
Ад песень дудароў...

Тэкст кнігі ня скончаны. І гэта – запрашэнне да ўсіх, хто хоча, ісці па гэтай дарозе, як я ішла за вялікімі геніямі Гамера, Сапегі, нашых дзядоў.

Светлана Новікава



Частка 1.

ІЕРАРХІЧНАЯ  
МАТЭМАТЫКА



## 1.1. АСНОЎНАЯ СХЕМА



$\leftrightarrow A^\lambda$  — свет, математика

$\downarrow_0 \leftrightarrow \alpha^\lambda$

$$A^\lambda \xleftrightarrow{\delta} \left\{ \begin{matrix} \beta^\lambda & \delta \\ \omega & \rho & \sigma \end{matrix} \right\}^\lambda \xrightarrow{\frac{A^\lambda}{\rho}} \beta$$

$$A^\lambda \xleftrightarrow{\delta} \left\{ \begin{matrix} \beta^\lambda & \delta \\ \omega & \rho & \sigma \end{matrix} \right\}^\lambda \xrightarrow{\frac{A^\lambda}{\rho}} \beta$$

$$\Lambda^\lambda \xleftrightarrow{\delta} \left\{ \begin{matrix} \beta^\lambda & \delta \\ \omega & \rho & \sigma \end{matrix} \right\}^\lambda \xrightarrow{\frac{\Lambda^\lambda}{\rho}} \beta$$

$$\rho^\lambda \xleftrightarrow{\delta} \left\{ \begin{matrix} \beta^\lambda & \delta \\ \omega & \rho & \sigma \end{matrix} \right\}^\lambda \xrightarrow{\frac{\rho^\lambda}{\rho}} \beta$$

$$\Gamma^\lambda \xleftrightarrow{\delta} \left\{ \begin{matrix} \beta^\lambda & \delta \\ \omega & \rho & \sigma \end{matrix} \right\}^\lambda \xrightarrow{\frac{\Gamma^\lambda}{\rho}} \beta$$

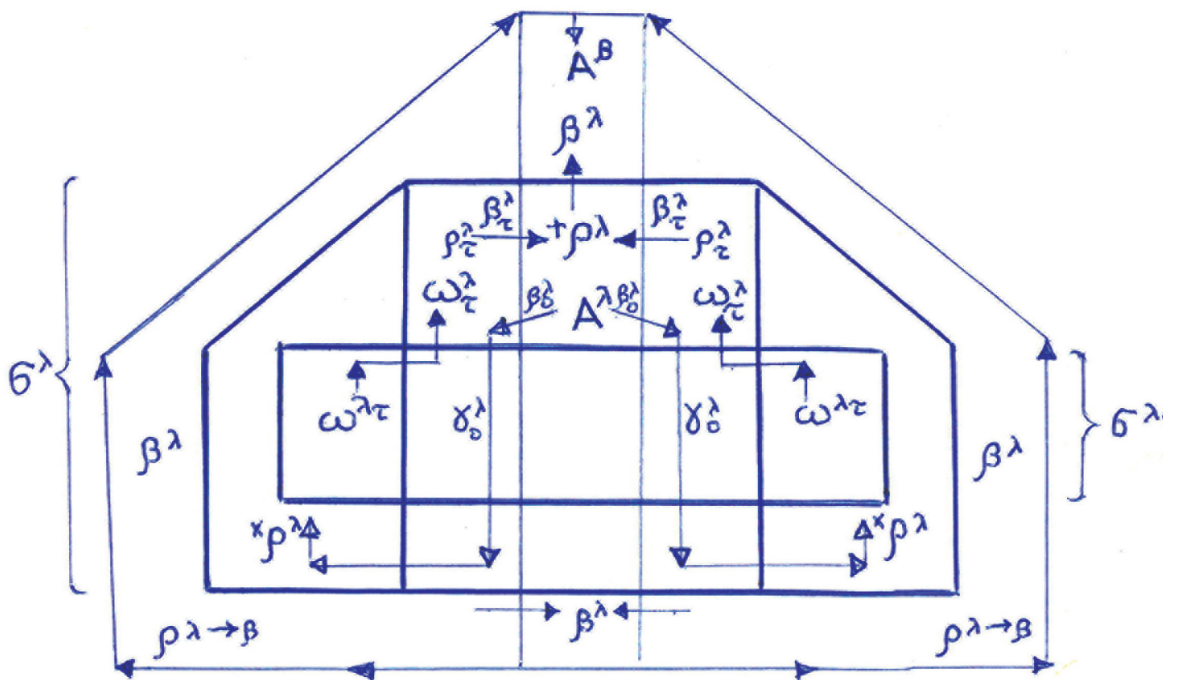
$$\Omega^\lambda \xleftrightarrow{\delta} \left\{ \begin{matrix} \beta^\lambda & \delta \\ \omega & \rho & \sigma \end{matrix} \right\}^\lambda \xrightarrow{\frac{\Omega^\lambda}{\rho}} \beta$$

$$\Sigma^\lambda \xleftrightarrow{\delta} \left\{ \begin{matrix} \beta^\lambda & \delta \\ \omega & \rho & \sigma \end{matrix} \right\}^\lambda \xrightarrow{\frac{\Sigma^\lambda}{\rho}} \beta$$

$$B^\lambda \xleftrightarrow{\delta} \left\{ \begin{matrix} \beta^\lambda & \delta \\ \omega & \rho & \sigma \end{matrix} \right\}^\lambda \xrightarrow{\frac{B^\lambda}{\rho}} \beta$$

$$A^\beta \xleftrightarrow{\delta} \left\{ \begin{matrix} \infty & \delta \\ \omega & \rho & \sigma \end{matrix} \right\}^\beta \xrightarrow{\frac{A^\beta}{\rho}} \infty$$

$\downarrow_0 \leftrightarrow \alpha^\lambda$







## 1.2. ВИСНОВЫ





$\Lambda, \lambda$  - лік

лік світлу  $A^\lambda$  - яш ключавая мерка - ранг (уздым, межаны, узровень) у іерархіі нумар месца і часу ў гісторыі, магчымасць (мернасць, магнітуда, велічыня), магчымасць (поле туману), цяга (зарад), рэў (кірунак і характар руху), ...

лікамі вымяраюцца ўсе орты  $A^\lambda$ : лік  $\lambda^\lambda$ , рух  $r^\lambda$ , лад  $\delta^\lambda$ , рэз  $\omega^\lambda$ , поле  $b^\lambda$ , туман  $\beta^\lambda$ , мэта і ўлада  $A^\lambda$  і  $A^\beta$

лікі ў  $A^\lambda$  - іерархічныя сістэмы, яны ўключаюць усе заданыя орты і вымяраюцца імі

лік  $\lambda$  - сімвал (літэра, літара, знак, метка),  $\Lambda$  - светлікаў, пан-лік - сістэма сімвалаў (схема, код) з механізмам яе змены (іерархічная арыфметыка, граматыка іерархічных сістэм)

Тэхнічная сістэма разлікаў - аэа-працэсар (лігильнік, машына)

$P, p$  - рух, мах (множанне і складанне)

акт, змена, дзея, праца, тэхналогія, рэў, ход, зон, цэа, ...

адзінка руху  $r^\lambda$  - мах  $\lambda$ , сімвал -  $\frac{\lambda}{\lambda}$ , змест  $r^\lambda \leftrightarrow \{ \oplus^\lambda, \otimes^\lambda, \oplus^\lambda \}$  уключае тры такты:

$$\oplus^\lambda \leftrightarrow +r^\lambda \xrightarrow{\tau} \omega : b^\lambda \xrightarrow{\tau} \omega^\lambda, \quad \otimes^\lambda \leftrightarrow \times r^\lambda \xrightarrow{\omega} b : \omega^\lambda \xrightarrow{\omega} b^\lambda, \quad \oplus^\lambda \leftrightarrow +r^\lambda \xrightarrow{\beta} \omega : b^\lambda \xrightarrow{\beta} \omega^\beta$$

дзе  $\lambda_\tau \rightarrow \lambda \rightarrow \beta$ ,  $\tau$  - лік ( $\tau \in \Lambda^\lambda$ ),  $\lambda_\tau$  - лічбы (архіўны, знікаючы) час,  $\lambda$  - пануючы (бяцуючы) час,  $\beta$  - новы (ўзнікаючы) час; светлы канец стрэкі маха накіраваны ў  $\lambda_\tau$ , дзе такт  $\oplus^\lambda$  выконвае складанне - сцязванне, стык архіўных сістэм  $\{ \omega^\lambda \xrightarrow{\tau} b^\lambda \}$  і  $\{ \omega^\beta \xrightarrow{\beta} b^\beta \}$ , такт  $\otimes^\lambda$  працуе ў зоне ўлады - множыць  $\omega^\lambda \leftrightarrow \alpha^\lambda$ , цёплы канец маха накіраваны ў поле туману  $\beta^\lambda$  дзе выконваецца новае складанне  $\oplus^\lambda$ ; мах унікае ў змест архіўных сістэм і змяняе іх лад на пануючы, множанне пануючага ладу ў змяняе туман, а такт  $\oplus^\lambda$  праца аўтарнаў новых сімвалаў

$r^\lambda$  - натуральная гісторыя светлу  $A^\lambda$  у час  $\lambda_\tau$  яш ўзнікнення ў свеце  $A^\lambda$ ,  $r^\lambda$  - гісторыя панавання  $A^\lambda$  у задзінну ўлады (уласная гісторыя  $A^\lambda$ , якая ўключае задзінну множанна (задаў)  $\lambda$  і задзінну складанна (прапаноў)  $\lambda$ ),  $r^\lambda$  - натуральная гісторыя новага светлу  $A^\beta$ ,  $r^\beta$  - гісторыя змены светлу  $A^\lambda$  у час  $\beta$  - час панавання  $A^\beta$  - мэта ўлады светлу  $A^\lambda$

$P^\lambda$  - механіка іерархічных сістэм, кібернетыка - сімвал светлу  $A^\lambda$  у руху

$\Gamma, \gamma$  - лад, сістэма; мера; мяжа, кан, гаць; уздым; шкала; сірата; схема, сказ; знак, сігнал; мена

закон, статут; мост, стык, сувязь, кантакт, узаемадзеянні, абмен; метка; азнагэнне, размеркаванне, ...

орт (варт, вось вярзэння, мервартасці, годнасці, гарту, вагі), ордэр (варта, парадак, сірой), сістэма ардынат - уздымаў, размернасць поля, мернасць адзінкі, вага рэзы, хуткасць руху, ...

лад змяняецца ад загадкавага (схаванага, туманнага, хімерызнага, магічнага, ладу пытанняў, прапаноў, навукі) да вядучага (тутаральнага, узорнага, у тым ліку аднаўляемага ладу хвалі (вандроўнага)), загаднага (пануючага, татальнага, асветнага), тэхнічнага (множнага) і лічбы (архіўнага, знікаючага, наканаванага)

законы ў  $A^\lambda$  (у іх ліку роўнасці  $\{ \leftrightarrow \}$  і рэі  $\{ \rightarrow, \uparrow \}$ ) ўключаюцца ў поле  $\Gamma^\lambda$  дзе орты  $A^\lambda$  - сіраты гэтай поля

$\Omega, \omega$  - рэз, сцяг - адзінка, адзінкавы лік, імя, сістэма

тэхнічная адзінка - тэх:  $\beta \text{тэх}^\lambda \leftrightarrow \beta \omega^\lambda \leftrightarrow \beta 1^\lambda$ ;  $\beta$  - мернасць адзінкі,  $\tau$  - нумар месца і часу ў  $A^\lambda$

ардынарная (радавая, звязаная) рэз у паі, зместе  $b^\lambda$  (у навакальным свеце), месціз, доля, частка, ...

адзінка ўлады: аўтар  $1^\lambda$ , пан  $1^\lambda$  (крыніца, аснова, арыгінал), нулявы кон - кон  $0^\lambda \leftrightarrow \alpha^\lambda$

$$1^\lambda \leftrightarrow 1^\lambda \leftrightarrow A^\lambda \leftrightarrow \omega^\lambda$$

тутар (тут  $1^\lambda$ ), узор  $1^\lambda$ , орт  $1^\lambda$  (варт  $1^\lambda$ , вядучая сістэма), дзесяткі кон - кон  $10^\lambda \leftrightarrow \alpha^{10}$

$$10^\lambda \leftrightarrow 10^\lambda \leftrightarrow 10^\lambda \leftrightarrow \omega^{10} \leftrightarrow \omega^{10}$$

мэта ўлады, пан  $1^\lambda$  (схаваная ўлада (туман  $\infty^\lambda$ ) - хем  $1^\lambda \rightarrow \beta$ , татальная ўлада

- тот  $1^\lambda \rightarrow \beta$ , сім  $1^\lambda \rightarrow \beta$  (сімвал светлу  $A^\beta$  на мяжы ліі  $\beta$ )), мэтавы кон - кон  $1^\lambda \rightarrow \infty \leftrightarrow \alpha^{1 \rightarrow \beta}$

$$1^\lambda \leftrightarrow \infty 1^\lambda \rightarrow 0 1^\lambda \leftrightarrow A^\beta \leftrightarrow \omega^\beta$$

адзінка меры (сігнал ўлады):  $\{ \text{анг, ліз, мах, мех, хем, пан, орт, дім, цяг, такт, кут, ...} \}^\lambda$ ,

$\{ -, 0, + \}^\lambda$  - адзінкі кірунку, мена  $1^\lambda$  - адзінка змены, абмену

$\Sigma, \sigma$  - поле, змет - множны лік,  $\{ \dots \}^\lambda$

хмара; звяз; склад; будова, канструкцыя, арганізацыя; суполка, зона, кола, рэў, зарга, звязно, агон, ...

асноўныя зоны поля: пан  $1^\lambda$  (кола ўлады з пануючым татальным ладам), хем  $1^\lambda$  (зона туману, хімерызны лад),

мех  $1^\lambda$  (механізм тутаральна ўладкаваны агон пануючага кола, яш выканаўчы механізм - зона сістэм

лічбы і часу  $\lambda^\lambda$ , ёш лад на мяжы з пануючым), рэў  $1^\lambda$  (звэно лічбы лаг  $\lambda_\tau$  з хвалі руху  $\oplus^\lambda$  і

цягаў да механічнага агону) і арх  $1^\lambda$  (зоно лічбы лаг  $\lambda_\tau$  з хаатычным рухам  $r^\lambda$ ).

$B, \beta$  - мэта, іерархічны туман, хаос, новы свет

воля, цяга, магчымасць, вяртанне; цешра, хмара (хімера); поле думкі, навукі, змены ўлады і рангу - нумару месца і часу ў тарадзе змен свету, ...

адзінка туману - хем<sup>λ</sup>, лікавая мера поля β<sup>λ</sup> - мернасць свету A<sup>λ</sup>, яго ўздым да A<sup>β</sup>

сімвал туману: ∞<sup>λ</sup> (знак вяртання, няскончанасці) і ?<sup>λ</sup> (знак туманнага ведоў)  
 $?^{\lambda} \leftrightarrow \infty^{\lambda} \rightarrow 0^{\beta}$

A, α - сімвал свету, матэматыкі

аўтар, пан, улада, веды, адзінка

імя - аэрг (вед, αησ)

адзінкі меры: пан<sup>λ</sup>, сім<sup>λ</sup>, тот<sup>λ</sup>, вед<sup>λ</sup>, свет<sup>λ</sup>, мат<sup>λ</sup>, α<sup>λ</sup> ↔ {α<sup>λ</sup>, α<sup>λ</sup>}, 1<sup>λ</sup>

A<sup>λ</sup>, α<sup>λ</sup> - свет ліку λ у сімвалах матэматыкі ліку λ A<sup>β</sup>, α<sup>β</sup> - матэматыка і свет ліку β, мэта свету A<sup>λ</sup>

(Усе літары ў сімвалах страт - элітнікія, але прапануецца казаць [а] і [э] замест [альфа] і [лямбда]:

A<sup>λ</sup> - [а-эль], A<sup>β</sup> - [а-бэта], λτ - [эль-таў], Λ<sup>λ</sup> - [эль-эль]; усе астатнія літары чытаць як звычайна: ρ<sup>λ</sup> - [ро-эль], δ<sup>λ</sup> - [дэла-эль], ω<sup>λ</sup> - [амега-эль], б<sup>λ</sup> - [сігма-эль], β<sup>λ</sup> - [бэта-эль].)

Сцяг сімвалаў A<sup>λ</sup> - матэматычныя сказы:

ωδ<sup>λ</sup> - лад ліку λ мернасці β адзінкі ω нумар τ

ρω → σ - рух р множання ⊗ ліку λ з асновай ωδ і мэтай б<sup>λ</sup>

Матэматыка A<sup>λ</sup> уключае матэматычную граматыку, іерархічныя лікі і механіку ў пануючы сімвалны сцяг  
 $\text{сім}^{\lambda} \leftrightarrow \alpha^{\lambda} \leftrightarrow \{\alpha^{\lambda}, \alpha^{\lambda}\}$

Змены гэтага сцяга (яго множанне і складанне) ўзводзяцца з рухам думкі - працэсам змены ведоў, чым ліку - з працэсам матэматычнага азначэння ўсіх сістэм свету.

Стратэгія матэматычнага азначэння (вымярэння) асобнай сістэмы (ε) - тэрма рухаў аф з пануючых страт да архіўных (з магчымымі вяртанямі) якая вымярае

лік λ сістэмы ?<sup>λ</sup> - яе ранг у іерархіі, месца і час у A<sup>λ</sup>

мернасць β сістэмы β<sup>λ</sup> у межах ліку λ, метку з пануючай сістэмы β<sup>α</sup>

законы β<sup>χ</sup> і адпаведныя ім меркі сістэмы β<sup>λ,δ</sup> (яе ардынаты, сігналы ўлады β<sup>α,λ</sup>)

адзінкавы лік ω сістэмы β<sup>ω,λ,δ</sup>; яе характарыстыкі ω<sup>δ,λ</sup> як рэч, яе множны лік {β<sup>ω,λ,δ</sup>}

навакольны свет ω<sup>б,λ,δ</sup>; месца ў ім τ сістэмы β<sup>ω,λ,δ</sup> (іншыя рэчы мернасці β і іх часткі β<sup>χ,λ</sup> з β<sup>ω,λ,δ</sup>)

змест б<sup>λ,τ</sup> - архіўныя страты часоў λ<sup>τ</sup> сістэмы β<sup>ω,λ,δ</sup>, яе памяць, чысны лад

рухі ω<sup>ρ,λ</sup> і ω<sup>ρ,λ,τ</sup> сістэмы β<sup>ω,λ,δ</sup> ў яе навакольным свеце ω<sup>б,λ</sup> і ўласным змесце б<sup>λ,τ</sup>

рух ρ<sup>λ,τ</sup> змены сістэмы яе ўладай β<sup>α,λ</sup> і яе зваротны рух ω<sup>ρ,λ</sup> → β змены ўлады  
 $\omega^{\rho, \lambda, \tau} \downarrow \beta^{\omega, \lambda, \delta}$

Сказ ведоў α<sup>λ</sup> разортваецца ў тэкст, калі яго месціць (засткі) аказваюцца асобнымі сказамі, гэе месціць, на якога накіравана ўвага, апінаецца ў пануючым каце як вядучая адзінка (тут<sup>λ</sup>) гэтага кола і мае механічны агон мех<sup>λ</sup> сімвалаў A<sup>λ</sup>:

ω<sup>δ,λ</sup> : δ<sup>λ</sup> ↔ тут<sup>λ</sup>, {λ, β, ω, τ}<sup>λ</sup> - механічны агон - мех<sup>λ</sup> (χ<sup>λ</sup>) ↔ мех<sup>λ</sup> (тут<sup>λ</sup>)

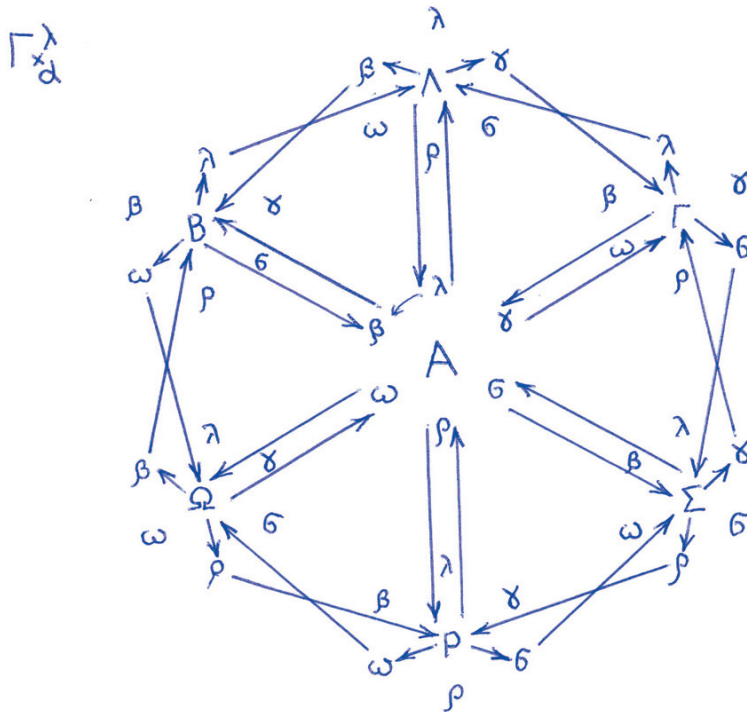
ρ<sup>ω,λ</sup> : ρ<sup>λ</sup> ↔ тут<sup>λ</sup>, {λ, ⊗, ω, б}<sup>λ</sup> - мех<sup>λ</sup> (ρ<sup>λ</sup>) ↔ мех<sup>λ</sup> (тут<sup>λ</sup>)

Схема α<sup>λ</sup> - лікава-іерагліфічны сімвал свету і схема аэрг-працэсара (тэхнічнай сістэмы разлікаў) - сцягвае тэрму рухаў згаданай стратэгіі (разам з іх магчымымі вяртанямі) ў адным месцы. Гэта месца (поле дзеянняў) размеркавана згодна з іерархіяй лікаў (мерак усіх сістэм) і рухамі іерархічнай механікі якая звязвае месцы лікаў у полі актам множання і складання. Усе лікі і рухі ў схеме α<sup>λ</sup> (і схема α<sup>λ</sup> як рухі лік) моцць множыцца і складвацца, а схемі іх улады - агортваць іх і ўнікаць у іх змест.

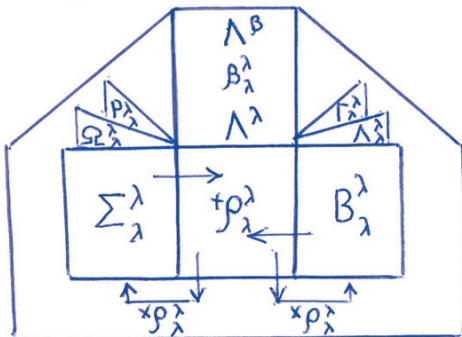
Такім чынам матэматыка A<sup>λ</sup> множыцца на ω<sup>λ</sup> - агортвае азначаемую тэхнічную адзінку ω<sup>λ</sup> ў яе месцы і часе і ўключаецца ў яе змест, надзяляючы ω<sup>λ</sup> ўсёй магчымасцю ўлады ведоў. Гэта ўлада дае магчымасць удасканалваць вядомыя сістэмы, складаць новыя і змяняць A<sup>λ</sup> - калі сістэмы аказваюцца за межамі зместу матэматыкі. У такім разе A<sup>λ</sup> апінаецца ў тумане, чым лік магутней за яе лінулы ранг. Туман разортвае межы A<sup>λ</sup> і актывізуе рух складання новых сімвалаў, а яны - рух множання і новы туман.

Символ  $\alpha^\lambda$  свету  $A^\lambda$ , уключаны ў змест яго лінейных страт  $\alpha^{\lambda\tau}$ , азначае іх новую аснову –  $\alpha^\lambda$ , і час  $\lambda$  апынаецца раней за ўсе лінейныя часы  $\lambda\tau$ . Такім чынам  $\alpha^\lambda$  азначае і шуканае ўласнае лінейнае – натуральную гісторыю  $\rho^\lambda$ . Яна хваецца ў памяці, але яе мэта – сімвалы свету, улада ведаў – сцягваецца ў адзінку на мяжы новага свету  $A^\beta$  і мношчыца ў сістэмах часу  $\lambda$  рухам іх асветы. Гэты рух уздымае ранг сістэм і разгортвае іх межы. Іх лінейны (наканаваны, знікаючы) лаг змяняецца на пануючы, а іх адметныя вартасці ўключаюцца ў матэматыку.

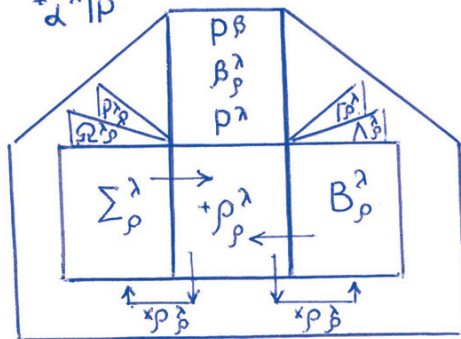
Асноўныя орты  $A^\lambda$  – вынік гэтага руху. Яны – ключавыя кірункі натуральнай гісторыі матэматыкі ў час яе ўзнікнення  $\lambda$ , калі яны працавалі як асобныя сістэмы з рознымі зместамі і законамі. Орты  $A^\lambda$  і зараз маюць іх адметныя меркі ( $\lambda$ -лік,  $\omega$ -рэз,  $\rho$ -рух, ...). Але сімвалы свету  $\alpha^\lambda \rightarrow \{\alpha^\lambda, \alpha^\lambda\}$  у іх зместах – іх моцныя галі (усе рэзы  $\omega^\lambda$  ліку  $\lambda$  – рухоныя, усё рухі  $\rho^\lambda$  маюць адзінку (ці множны лік адзінак) у іх асновах і мэтах, ...). Згаданыя галі даюць магчымасць хуткага абмену ортаў  $A^\lambda$  зменамі іх зместаў у руху думкі і руху матэматыкі. Абмен у полі думкі  $\beta^\lambda$  выконваецца разам – у якім бы месцы гэтага поля ні апынуліся сімвалы страт – іх рух у  $\beta^\lambda$  абганяе ўсе рухі мінулага часу (ва ўзнікненні  $A^\lambda$ ). Схema  $\Gamma_{\alpha^\lambda}^\lambda$  азначае галі сказавых сімвалаў ортаў  $A^\lambda$  у руху  $\rho^\lambda \rightarrow \beta^\lambda$ . Усе орты  $A^\lambda$  маюць і лікава-іерархічныя сімвалы. Іх узоры – схемы  $\alpha^\lambda | \Lambda$  і  $\alpha^\lambda | \rho$ , якія разгортваюцца ў іерархічную арыфметыку  $\Lambda^\lambda$  і механіку  $\rho^\lambda$ .



$\alpha^\lambda | \Lambda$



$\alpha^\lambda | \rho$

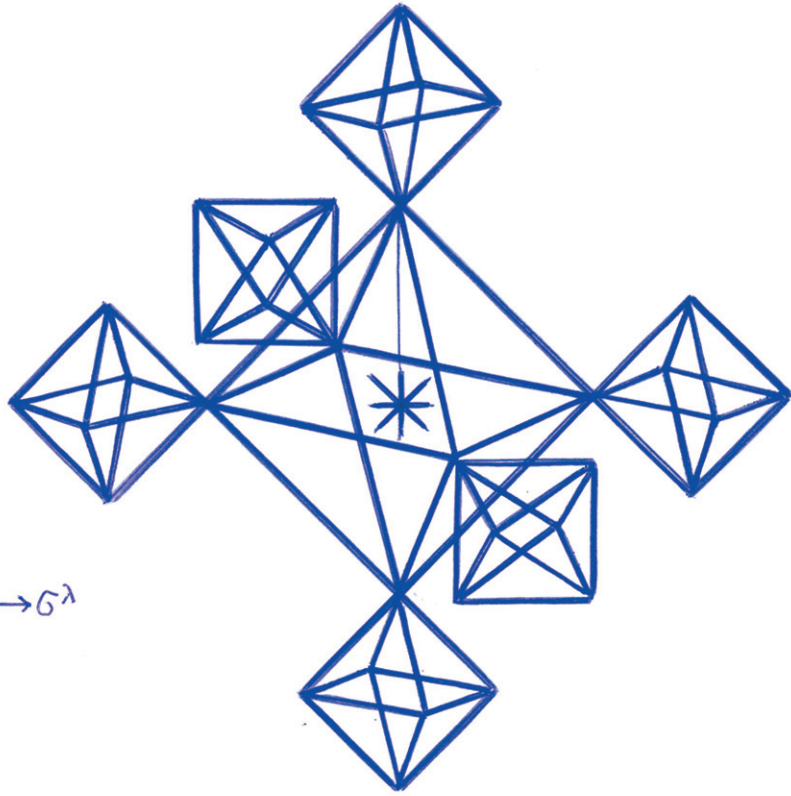








$$\alpha^{\lambda} | \Omega^{\lambda \tau \rightarrow \lambda}$$



$$\infty 0 \times \rho_{\omega \rightarrow \sigma}^{\lambda} : {}^0 \omega_0^{\lambda} \rightarrow \sigma^{\lambda}$$

$$\infty 100 + \rho_{\sigma \rightarrow \omega}^{\lambda \tau \rightarrow \lambda} : 100 \omega_0^{\lambda \tau} \rightarrow 1000 \omega_0^{\lambda \tau} \leftrightarrow \left\{ \begin{array}{c} \text{hourglass} \\ \text{hourglass} \end{array} \right\}_{\sigma}^{\lambda \tau} \rightarrow \left\{ \begin{array}{c} \text{hourglass} \\ \text{hourglass} \end{array} \right\}_{\sigma}^{\lambda \tau} \rightarrow 1000 \omega_0^{\lambda \tau} \leftrightarrow {}^0 \omega_0^{\lambda}$$

$$\infty 100 \times \rho_{\omega \rightarrow \sigma}^{\lambda \tau} : 100 \omega_0^{\lambda \tau} \rightarrow 100 \omega_0^{\lambda \tau} \leftrightarrow \left\{ \begin{array}{c} \text{hourglass} \\ \text{hourglass} \end{array} \right\}_{\sigma}^{\lambda \tau} \rightarrow \left\{ \begin{array}{c} \text{hourglass} \\ \text{hourglass} \end{array} \right\}_{\sigma}^{\lambda \tau}$$

$$\infty 10 + \rho_{\sigma \rightarrow \omega}^{\lambda \tau} : 10 \omega_0^{\lambda \tau} \rightarrow 100 \omega_0^{\lambda \tau} \leftrightarrow \left\{ \begin{array}{c} \triangle \\ \triangle \end{array} \right\}_{\sigma}^{\lambda \tau} \rightarrow 10 \omega_0^{\lambda \tau} \leftrightarrow 100 \omega_0^{\lambda \tau}$$

$$\infty 10 \times \rho_{\omega \rightarrow \sigma}^{\lambda \tau} : 10 \omega_0^{\lambda \tau} \rightarrow \sigma^{\lambda \tau} \leftrightarrow \left\{ \begin{array}{c} \triangle \\ \triangle \end{array} \right\}_{\sigma}^{\lambda \tau} \rightarrow \left\{ \begin{array}{c} \triangle \\ \triangle \end{array} \right\}_{\sigma}^{\lambda \tau}$$

$$\infty 0 + \rho_{\sigma \rightarrow \omega}^{\lambda \tau} : {}^0 \omega_0^{\lambda \tau} \rightarrow 10 \omega_0^{\lambda \tau} \leftrightarrow \left\{ \begin{array}{c} \text{rectangle} \\ \text{rectangle} \\ \text{rectangle} \end{array} \right\}_{\sigma}^{\lambda \tau} \rightarrow \left\{ \begin{array}{c} \text{rectangle} \\ \text{rectangle} \\ \text{rectangle} \end{array} \right\}_{\sigma}^{\lambda \tau} \leftrightarrow 10 \omega_0^{\lambda \tau}$$

$$\infty 0 \times \rho_{\omega \rightarrow \sigma}^{\lambda \tau} : {}^0 \omega_0^{\lambda \tau} \rightarrow \sigma^{\lambda \tau} \leftrightarrow \left\{ \begin{array}{c} \text{rectangle} \\ \text{rectangle} \\ \text{rectangle} \end{array} \right\}_{\sigma}^{\lambda \tau} \rightarrow \left\{ \begin{array}{c} \text{rectangle} \\ \text{rectangle} \\ \text{rectangle} \end{array} \right\}_{\sigma}^{\lambda \tau}$$

Схема  $\alpha^{\lambda} | \Omega^{\lambda \tau \rightarrow \lambda}$ : беларускі каляндры павук – магічны сімвал года (калі рух сьвязваецца ў рэз якая захоўвае і множыць мінулае і складае новае): саваміна з ніткай  $\omega_0^{\lambda \tau} \leftrightarrow \omega_0^{\lambda \tau}$  мера двух узён (абаротаў зямлі вакол асі), кут  $10 \omega_0^{\lambda \tau}$  – тыдзень (сёмы (дзевяты) дзень новай мернасьці якая сьвязвае каляіну  $\omega_0^{\lambda \tau}$  і кут), каля з гатыраж куту – Месяц  $100 \omega_0^{\lambda \tau}$ , двайная пірамідка – 2 месяцы (адзін з іх вясновы ці летні, а другі – яшчэ рэжа ў годзе – восеньскі ці зімовы), месяцавы год – вялікая двайная пірамідка  $1000 \omega_0^{\lambda \tau} \leftrightarrow \omega_0^{\lambda \tau}$ , светлыя месяцы маючыцца да яе, а іх цёмнае рэжа спынаецца ў вонкавым агонь (які ў руху зямлі вакол сонца), астатнія дні да сонечнага года месяцава ў зорку (сімвал руху множання і складання), яна і нагадвае павука ў карунках павуцінныя.

Матэматычна схема  $\alpha^{\lambda} | \Omega^{\lambda \tau \rightarrow \lambda}$  азначае ўздым мернасьці ў межах  $\beta$ -поля  $\beta^{\lambda}$  сістэмы  $\omega_0^{\lambda \tau}$  каля тэхнічнага адзінка  $\omega_0^{\lambda \tau}$  у руху  $\rho^{\lambda \tau \rightarrow \beta}$  абаротваецца тутаральнай ( $10 \omega_0^{\lambda \tau}, 100 \omega_0^{\lambda \tau}$ ) і татальнай ( $1000 \omega_0^{\lambda \tau}$ ) уладчай сьвету  $A^{\lambda}$  – крыніцай  $\omega_0^{\lambda \tau}$  сьвету  $A^{\beta}$ . Гэта азначэнне годнае і ў мінулым сьвец  $A^{\lambda \tau}$ : дзакружыць зраўнаеці азда  $A^{\lambda}$  агортваць мінулае і ўнікаць у яшчэ шэсьць, азначэнне змен  $\beta^{\lambda}$  мернасьці  $\beta^{\lambda}$  у полі тыману  $\beta^{\lambda}$  сістэмы  $\beta^{\lambda} \omega_0^{\lambda \tau}$  перанесена ў сістэму  $\beta^{\lambda} \omega_0^{\lambda \tau}$  і аднадулае натуральную гісторыю сьвету  $A^{\lambda}$ .



$\alpha^\lambda | \beta^\lambda$

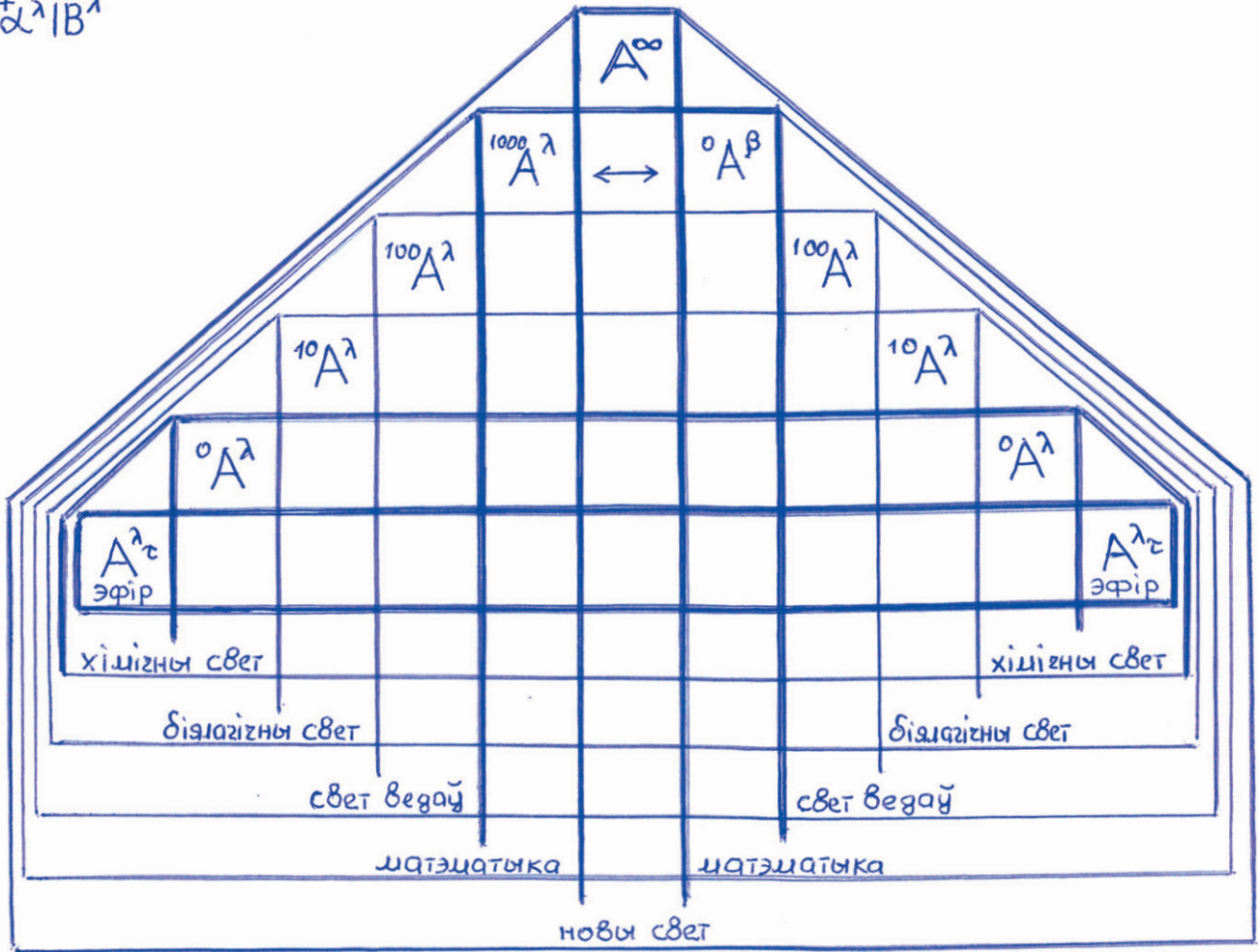
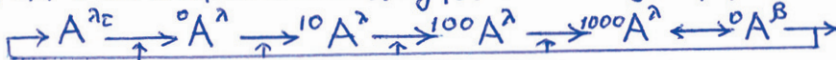


Схема  $\alpha^\lambda | \beta^\lambda$  - лікавы сімвал свету  $A^\lambda$  (іерархічная, месцава размеркаваная метрыка  $A^\lambda$ ) у час  $1000^\lambda \leftrightarrow 0^\lambda$  калі матэматыка  $1000^\lambda A^\lambda \leftrightarrow 0^\lambda A^\beta$  сцязбаецца ў адзінку  $\omega_0^\beta \leftrightarrow A^\beta$  - татальную ўладу ў  $A^\lambda$ , кон, мяжу  $A^\lambda$  з  $A^\beta$ .

Свет  $A^\lambda$  на мяжы з  $A^\beta$  апынаецца механічным агонем  $0^\lambda$  матэматыкі  $A^\lambda$  - крыніца, аўтара новага свету  $A^\beta$ . Хімічны агонь  $\beta^\lambda$  матэматыкі  $0^\lambda A^\beta$  і гэтак  $A^\infty$  хаваньца ў чыстры загадкавага ладу часу  $\beta$ . Так і чымны туман  $\beta^\lambda$  часу  $\lambda$  хавай свет  $A^\lambda$  на яго мяжы з мінулым светам  $A^\lambda \tau$ .

Туман  $\beta^\lambda$  на мяжы  $A^\lambda$  з  $A^\beta$  знікае. Яго мінулы загадкавы лад змяняецца на вядомы - накіраваны, кіруемы загадкамі пануючай адзінкі  $1000^\lambda \leftrightarrow \omega_0^\beta$  якая арганізавае свет  $A^\lambda$  і ўнікае ў змест усіх яго частак, у іх ліку і ў змест сістэм мінулага (эфірнага) свету  $A^\lambda \tau$ . Натуральная гісторыя матэматыкі сконжана.

Рух  $\beta^\lambda \rightarrow \beta$ :  $A^\lambda \rightarrow A^\beta$  і час  $\lambda$  зараз сцязбаюцца ў рэг змацаваную іерархію межаняў



Межані (мернасці, каы, страты, узроўні) разам з лікавымі сімваламі маюць імяны ў гукавым гашане:  $A^\lambda \tau$  - поле эфіру,  $0^\lambda A^\lambda$  - хімічны свет,  $10^\lambda A^\lambda$  - біялагічны свет,  $100^\lambda A^\lambda$  - свет ведая,  $1000^\lambda A^\lambda$  - матэматыка. Гарга межаняў - іерархічная, яны пануюць у мінулых сіратах (ахутваюць іх і ўнікаюць у іх) і прапануюць новыя мернасці - іх мэта і ўладу. Загадкаваць мэта вядзе да рознага веку сістэм  $\beta^\lambda$ ,  $\beta \leftrightarrow \{1, \dots, 999\}$  у згаданых колах. Век аўтараў уладу чыняцца у новыя колы, іх праца ўключаецца ў рух уладу. Асітніа сістэмы - гэсовая, іх мэта аказваюцца смеццем, а іх смерць - канец іх дзейнасці.

Веды матэматыкі  $0^\lambda A^\beta$  (у іх ліку і ключавыя схемі  $\alpha^\lambda \leftrightarrow \{\alpha^\lambda, \alpha^\lambda\}$ ) - ванік працы ў руху  $\beta^\lambda$  які чыняцца з мінулага свету  $A^\lambda \tau$  у новы свет  $A^\beta$ . Гон  $\alpha^\lambda | \beta^\lambda$  азначае адзінку руху матэматыкі - мах  $\beta$ , дзе такт складання (натуральная гісторыя матэматыкі)  $\beta^\lambda \rightarrow \beta$  вядомы, а такты множання  $\beta^\lambda \rightarrow \beta$  і новага складання  $\beta^\lambda \rightarrow \beta$  зараз туманьня. Яны - ў полі мэта сцязга  $0^\lambda A^\beta$ .

Мэта (і мэта загадкавай натурі, і дзювога ўлада як мэта накіраваных сістэм) рухоа свет, цягне яго змяняцца, а свет змяняе мэта. Адзінка мери мэта і ўладу ў гэтым працэсе - цяг (цяг  $\lambda$  у час  $\lambda$ , цяг  $\beta$  у час  $\lambda$ ). Адзінка мернасці іерархічнага туману  $\beta^\lambda$  у руху яго змены -  $\delta^\lambda$  (ці туч  $\lambda$ , хем  $\lambda$ ).

Математика - символ свету з усіма його речами. У вехах  $\alpha^2 \rightarrow \{\alpha^1, \alpha^2\}$  закони зміни свету уключає орт  $P^2$  - механіка ієрархічних систем. Механіка  $P^2$  у працях Гюльє (кіравання і констрування) - ієрархічна кібернетика. А система актів складання і множення вехах (у їх ліку і символах  $\alpha^2 \rightarrow \{\alpha^1, \alpha^2\}$ ) - навук і света. Схема  $\alpha^1 \beta^2$  - математична фундація поля науки і света, палізон вехах где практично Гюльє  $P^2 \beta^1 \alpha^2$  має магнімасць мерниць і магнімасць і зміняць іх лад.

Навук працює у зонах туману где яна мусить уздымаць мернасць вехах і прапановуваць новыя символи. Лірактывнае меранне іх магнімасць можна выклікаць знікненне вялікіх систем. Палізон вехах (поле дулікі)  $\alpha^1 \beta^2$ , где Гюльєаны ўсе вядомыя і новыя орты свету і ўключаны закон іх зміны, где магнімасць разлізваць мэты і вынікі навук. Калі разлік (абмеркаванне) ў полі  $\alpha^1 \beta^2$  вехах математыкі дазваляе лігыць прапанову навукі іоднай, яна мотжа ўключаяцца ў рух светах вядомых сіратак сігнал (загад) уладу.

Асвета - рух навучэння вядомых (лінулых, наканававых) систем, такт маху іх уладу які сцягвае яе механічны агон. Рухам навучэння ўлада ієрархічных систем аднаўляе і ўдасканальвае ісіруемыя рэчы, развортбае іх магнімасць і ўздымае іх мернасць. Рух светах наканававага поля - хвала где рэч, навуканая сігналамі ўладу, апываюцца звязою зона які рухае сігнал уладу да мяжы гэтага поля. Асвета вядомых систем  $A^2; A^1$  у полі  $\alpha^1 \beta^2$  выконваецца рухам іх агортвання і ўключэння математыкі ў іх змест - змена іх мэты і навакольнага свету і навуценнем іх усеі магнімасцю іх уладу.

Лінулы свет  $A^2$  (зья ладзіна ўладу лэ зараз у лінулым), узакуюць руху яго светах символахі вехах  $\alpha^2 \rightarrow \{\alpha^1, \alpha^2\}$ , уключае ўсе орты  $\{A, L, P, G, S, V\}$  математи  $A^2$  мяняюцца ў лікавай шкале  $\beta^2 \leftrightarrow \delta^1$  (у схеме  $\alpha^1 \beta^2 \beta^2$ ). Гэта дазваляе ўключаяць новыя мэты поля эфіру  $A^2$  і яго новыя зміны.

Межоні  $A^1, A^2, A^3, A^4$  - орты ієрархічнага туману  $V^2$ . Орт  $A^2$  - поче хімерызнага ладу, орты  $A^1, A^2, A^3, A^4$  тутаральная, а орты  $A^1, A^2, A^3, A^4$  - таталяная ўлада ў  $V^2$ . Туман  $V^2$  - хімерызны агон яго крыніцы  $\alpha^1$  і механічны агон математи  $A^2$ . Згаданая орты - ієрархічныя сістэмы якія працуюць у межах законаў механікі  $P^2$ . Іх крынічныя азінкі - суча іх уласных механічных агонах. Гэтыя азінкі множацца, а ў галях іх хімерызных агонах (атрыманых рухам іх множання) складаюцца іх пануючыя коні - новыя мернасці.

Хімічны свет  $A^2$  - вынік множання таталянай ўладу  $A^2 \rightarrow \omega^2 \leftrightarrow \alpha^2$  эфірнага свету  $A^2$ , хімерызны агон  $\beta^2$  яго крыніцы  $\omega^2$  (множны лік яе тэхнічных азінак  $\{\omega^2\} \leftrightarrow \beta^2$ ). Хімічныя рэчы  $\omega^2$  маюць часова механічныя (эфірныя) агоны  $\beta^2$ , сістэмы ўладу  $\alpha^2 \leftrightarrow \omega^2$  і хімерызныя агоны  $\beta^2$ . Азінка руху  $\omega^2$  рэчы  $\omega^2$  сцягвае яе агон  $\beta^2$ , множыць уладу  $\omega^2$  і атрыманыю азінку туману  $\beta^2$  складае ў агон туману  $\beta^2$  (зону вынікаў множання ўладу  $\omega^2 \leftrightarrow \alpha^2$ ).

Ліраца хімічных систем (іх махі) змяняе эфірныя рэчы  $\omega^2$  часу  $\lambda$  на азінкі туману  $\beta^2$  (сістэмы часу  $\lambda$ ) - хімерызную ўладу ( $\beta$ -ўладу) ў полі  $\beta^2$ . Хімічныя азінкі  $\{\omega^2\}$  апываюцца у механічных агонах  $\beta$ -ўладу, месцава размеркававых яе сігналамі. Гэта схаваная ўлада змяняе эфір  $A^2$  і поле  $\beta^2$  где ўнікаюць зорныя сістэмы. Зоры - месцы где сцягваюцца ўладныя азінкі  $\alpha^2 \leftrightarrow \omega^2$  хімічных систем  $\omega^2$  і іх эфірныя агоны  $\beta^2$ . А месцы сцягвання  $\beta$ -азінак (хімерызных агонах)  $\beta^2$  хімічных систем  $\omega^2$  - міжзорны ієрархічны туман.

Хімерызная  $\beta$ -ўлада ў зорных працэсах сцискае тэхнічныя азінкі  $\{\omega^2\}$  у часовыя звязы где змяняюцца іх уяч, а іх махі ўзгадняюцца. Атрыманыя звязы размяркоўваюцца  $\beta$ -ўладах у рэч аж рознай меры - ланцугах, колах, сетках, кулях (яе механічных агонах). Тутаральная ўлада  $\omega^2 \leftrightarrow \alpha^2$  кола  $\beta^2$  здульна множыцца разам з яе механічным агонам  $\beta^2$  апываюцца конаш хімічнага свету где ўнікае орт бізмічных систем - новае мернасць свету  $A^2$ .

Тутаральная (узорная) ўлада  $\alpha^2$  хімічнага свету  $A^2$  - крыніца гукаў і вехах  $\{\omega^2\}$  якія ў бізмічным свеце  $A^2$  множацца і сцягваюцца новай ўладай - вехамі  $\omega^2$  - азінкам свету  $A^2$ . Вехы - гукава-вядомыя символы вядомых систем. Рух вехах адганяе ўсе рухі наканававых сірат. Гэта дазваляе разлізваць іх мэты, вынікі іх узейнасці і магнімасць змены. Разлік выконваецца ў палях дулікі рухам асноўных механізмах вехах. У іх ліку - граматыкі гукавых гомонах, тэхніка зміны вехах, лікавыя сістэмы.

Граматыкі гукавых гомонах і вядомых (ієраціфічных, арнаментальных) систем - асноўныя азінкі вехах - символы свету. У іх множных ліку (у полі  $\omega^2$ ) ўнікаюць орты математи  $\{A, L, P, G, S, V\}$  - уладу вехах. Схема  $\alpha^1 \beta^2$  - від натуральнай гісторыі математи і яе магнімай мэтай змены, яе рух сцэгнуты ў рэч. Змест гэтага рэчы - свет  $A^2$ . (схема  $\alpha^1 \beta^2$  дае магнімасць выконваць математи звычкі (акты механікі  $P^2$ ) у змесце математи і мерниць яе магнімасць: калі хача абна сістэма свету  $A^2$  ці лінулага свету  $A^2$  апываюцца за межамі математи (за цётсамі яе зместу) - математи маюць змяніцца.

## 1.3. ЗАДАЧЫ



$P^\lambda, p^\lambda$  - рух

Рух  $P^\lambda$  - механіка свету  $A^\lambda$

Механіка  $P^\lambda$  разом з арифметикою  $A^\lambda$  - основа класичних символічних атра - введень  $\alpha^\lambda \leftrightarrow \{x^\lambda, t^\lambda\}$ . Символи  $\alpha^\lambda \leftrightarrow \{x^\lambda, t^\lambda\}$  змінююча рухом  $p^\lambda, P^\lambda$  механіка введень і уяви, ієрархічною кібернетикою. Схеми  $\alpha^\lambda; \alpha^\lambda$  - сказ і від руху свету  $A^\lambda$  і математики  $A^\beta$ .

Акт свету  $\alpha^\lambda | p^\lambda$  називає орт руху  $P^\lambda$  усієї меркамі атра  $A^\lambda$ : рух має

лік (метань  $p^\lambda$  і мернаць  $p^\beta$ ) -  $p^\lambda t, p^\lambda, \infty p^\beta, p^\infty$ ;

механізм зміни -  $p^\lambda p^\lambda$ ;

лад  $p^\lambda, p^\lambda$  - систему мер і обмену руху, закони їх множення і складання в узв'язаних мернаць і змєнній метань;

адзінкавий лік руху  $p^\lambda, p^\lambda$ ; зго множити лік  $p^\beta, p^\lambda$ ;

уладу (нульови і дзєєтн кон)  $p^\lambda, p^\lambda$

мату  $p^\beta, p^\lambda$  - ієрархічны туман поля руху дзе ўзнікає їх новия улада.

Мах $^\lambda$  - адзінка руху

Адзінка руху - мах. Мах $^\lambda$  - адзінка руху свету  $A^\lambda$ , мах $^\beta$  - адзінка руху математики  $A^\beta$ .

Рух $^\lambda$  - система маху:  $рух^\lambda \leftrightarrow \alpha^\lambda | мах^\lambda, 1 мах^\lambda \leftrightarrow 1 анг^\lambda / 1 шіг^\lambda \leftrightarrow 1 мен^\lambda \leftrightarrow \updownarrow^\lambda$ .

Мах свету  $A^\lambda$ :

$$1 мах^\lambda \leftrightarrow \{ +r_{\sigma \rightarrow \omega}^{\lambda \rightarrow \lambda}, x_{\omega \rightarrow \sigma}^{\lambda \rightarrow \lambda}, +r_{\sigma \rightarrow \omega}^{\lambda \rightarrow \beta} \} \leftrightarrow \{ \oplus^{\lambda \rightarrow \lambda}, \otimes^\lambda, \oplus^\lambda \} \leftrightarrow \frac{\updownarrow^\lambda}{p^\lambda \omega^\lambda}$$

акты маха:

рух  $+r_{\sigma \rightarrow \omega}^{\lambda \rightarrow \lambda} \leftrightarrow чяг^\lambda \leftrightarrow \downarrow^\lambda \leftrightarrow \oplus^{\lambda \rightarrow \lambda} \leftrightarrow \oplus^{\lambda \rightarrow \lambda}$  - акт складання свету  $A^\lambda$  у свече  $A^{\lambda \tau}$  -

натуральная історыя свету  $A^\lambda$  у гадзіну прапаноў  $^{\lambda \tau}$ :

$$+r_{\sigma \rightarrow \omega}^{\lambda \rightarrow \lambda} : \sigma^{\lambda \tau} \rightarrow \omega^\lambda \leftrightarrow \alpha^\lambda \leftrightarrow A^\lambda,$$

рух  $x_{\omega \rightarrow \sigma}^{\lambda \rightarrow \lambda} \leftrightarrow p пан^\lambda \leftrightarrow \otimes^\lambda \leftrightarrow \otimes^\lambda$  - акт множення адзінкі  $A^\lambda$  у гадзіну загадкі  $^\lambda$ :

$$x_{\omega \rightarrow \sigma}^{\lambda \rightarrow \lambda} : \omega^\lambda \rightarrow \{ \omega_c^\lambda \} \leftrightarrow \sigma^\lambda,$$

рух  $+r_{\sigma \rightarrow \omega}^{\lambda \rightarrow \beta} \leftrightarrow \lambda \rightarrow \beta чяг^\lambda \leftrightarrow \uparrow^\lambda \leftrightarrow чяг^\beta \leftrightarrow \downarrow^\beta$  - акт складання математики  $A^\beta$  у

гадзіну прапаноў  $^{\lambda \tau}$ , натуральная історыя математики:

$$+r_{\sigma \rightarrow \omega}^{\lambda \rightarrow \beta} : \sigma^\lambda \rightarrow \omega^\beta \leftrightarrow \alpha^\beta \leftrightarrow A^\beta.$$

Мах математики  $A^\beta$ :

$$1 мах^\beta \leftrightarrow \{ +r_{\sigma \rightarrow \omega}^{\lambda \rightarrow \beta}, x_{\omega \rightarrow \sigma}^{\lambda \rightarrow \beta}, +r_{\sigma \rightarrow \omega}^{\beta \rightarrow \omega} \} \leftrightarrow \{ чяг^\beta, p пан^\beta, чяг^\infty \} \leftrightarrow \{ \oplus^\lambda, \otimes^\beta, \oplus^\beta \} \leftrightarrow \frac{\updownarrow^\beta}{p^\beta \omega^\beta}$$

натуральная історыя математики  $A^\beta$

Мах $^\lambda$  - натуральная історыя маха $^\beta$  (механіка  $P^\lambda$  - натуральная історыя механікі  $P^\beta$ ), а мах $^\beta$  - мах $^\lambda$  у гадзі і улада  $у$  гадзі  $у$ . На мяты  $A^\lambda; A^\beta$  мах $^\beta$  мае  $у$  механізм  $P^\lambda$  загадкавы лад шэты:  $p пан^\beta \leftrightarrow ?^\lambda \leftrightarrow \infty^\lambda, чяг^\infty \leftrightarrow ?^\lambda \leftrightarrow \infty^\lambda$ .

Мах $^\lambda$  - ієрархічная сістэма,  $p \lambda \tau \rightarrow \lambda \rightarrow \beta \rightarrow \infty \leftrightarrow \{ мах^\lambda \tau \rightarrow мах^\lambda \rightarrow мах^\beta \rightarrow мах^\infty \dots \}$  -

гарга ієрархічных сістэм, вынік зміны руху механікай  $P^\lambda$ . Адзінкі новай мернасьці  $у$  згаданай гарзе - гэты лічбны гадзі, затым - іх улады, затым яны  $у$  множны ліку ўключаны  $у$  змее метаулады:

$$\lambda \tau \rightarrow \lambda чяг^\lambda \tau \rightarrow чяг^\lambda \lambda \tau \rightarrow p^\beta \lambda \tau$$

$p^\beta \lambda \tau$  - змее (механічны агон) маха $^\lambda$ ,  $p^\beta \lambda$  - мех агон маха $^\beta$ ,  $p^\beta \beta$  - мех агон маха $^\infty$ :  $p^\beta \beta \leftrightarrow p мах^\infty$



Механіка  $P^\lambda$  розмірковує про змест ключових символів математики  $\alpha^\lambda \leftrightarrow \{\alpha^\lambda, \alpha^\lambda\}$  згодна з рухом  $p^\lambda \rightarrow \beta$  іх зменш  $\bar{y}$  свече  $A^\lambda$ .

Сказ  $\alpha^\lambda$ :

$$A^\lambda \xleftrightarrow{p} \left\{ \begin{matrix} \beta \\ \omega \\ \rho \\ \sigma \end{matrix} \right\}^\lambda \xrightarrow{A^\lambda} \beta$$

$$\Lambda^\lambda \xleftrightarrow{p} \left\{ \begin{matrix} \beta \\ \omega \\ \rho \\ \sigma \end{matrix} \right\}^\lambda \xrightarrow{\Lambda^\lambda} \beta \quad P^\lambda \xleftrightarrow{p} \left\{ \begin{matrix} \beta \\ \omega \\ \rho \\ \sigma \end{matrix} \right\}^\lambda \xrightarrow{P^\lambda} \beta \quad \Gamma^\lambda \xleftrightarrow{p} \left\{ \begin{matrix} \beta \\ \omega \\ \rho \\ \sigma \end{matrix} \right\}^\lambda \xrightarrow{\Gamma^\lambda} \beta$$

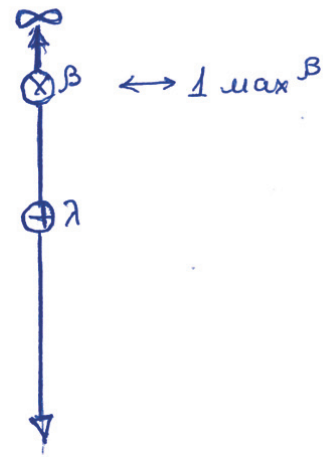
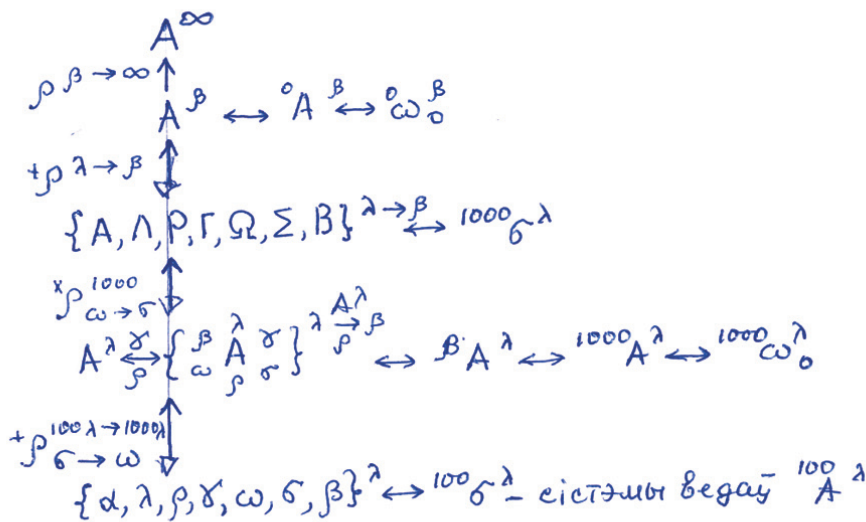
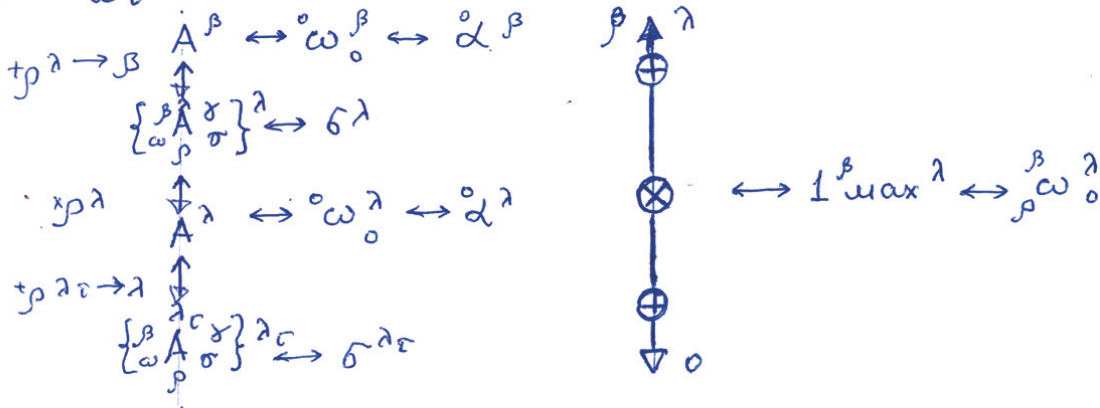
$$\Omega^\lambda \xleftrightarrow{p} \left\{ \begin{matrix} \beta \\ \omega \\ \rho \\ \sigma \end{matrix} \right\}^\lambda \xrightarrow{\Omega^\lambda} \beta \quad \Sigma^\lambda \xleftrightarrow{p} \left\{ \begin{matrix} \beta \\ \omega \\ \rho \\ \sigma \end{matrix} \right\}^\lambda \xrightarrow{\Sigma^\lambda} \beta \quad B^\lambda \xleftrightarrow{p} \left\{ \begin{matrix} \beta \\ \omega \\ \rho \\ \sigma \end{matrix} \right\}^\lambda \xrightarrow{B^\lambda} \beta$$

$$A^\beta \xleftrightarrow{p} \left\{ \begin{matrix} \infty \\ \omega \\ \rho \\ \sigma \end{matrix} \right\}^\beta \xrightarrow{A^\beta} \infty$$

Нулявих кон  $\omega_0^\beta$  сказа  $\alpha^\lambda$  - символ свету  $A^\lambda$  з умікам его руху:

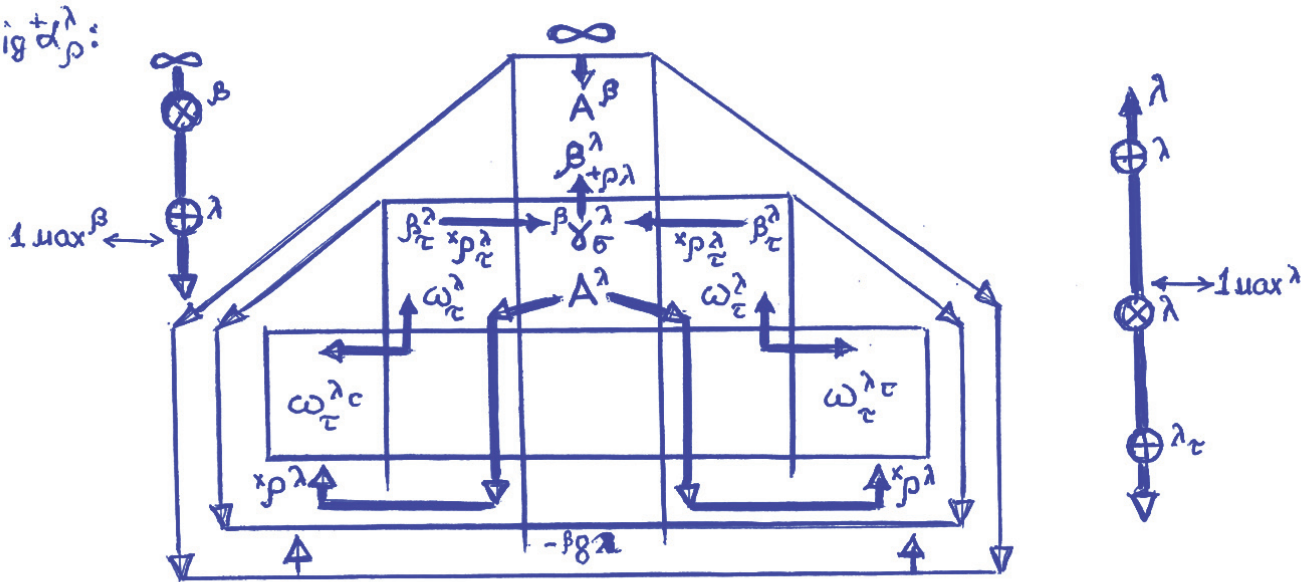
$$\omega_0^\beta \leftrightarrow \left\{ A^\lambda \xleftrightarrow{p} \left\{ \begin{matrix} \beta \\ \omega \\ \rho \\ \sigma \end{matrix} \right\}^\lambda \xrightarrow{A^\lambda} \beta \right\}, \left\{ \frac{\gamma}{p} \right\} \leftrightarrow \left\{ \begin{matrix} \xrightarrow{p} \omega \rightarrow \sigma \\ \xleftarrow{p} \omega \rightarrow \sigma \end{matrix} \right\} \leftrightarrow \gamma^\lambda \rightarrow \beta$$

Кон  $\omega_0^\beta$  - макс $^\lambda$ :



Асноўная адзінка сказа  $\alpha^\lambda$  выконвае  $1 \text{ макс}^\lambda$ . Яна ўзнікае  $\bar{y}$  свече  $A^\lambda$  - у руху  $tr^\lambda \rightarrow \beta$  складання сімвалічных сістэм (сістэм ведаю).  
 $\text{Макс}^\beta$  ўключае рух  $tr^\lambda \rightarrow \beta$  складання адзінкі  $A^\beta$  і рух яе множанні як рух навукі  $\bar{y}$  полі туману  $B^\lambda$ .

Виг  $\alpha^{\lambda}$ :

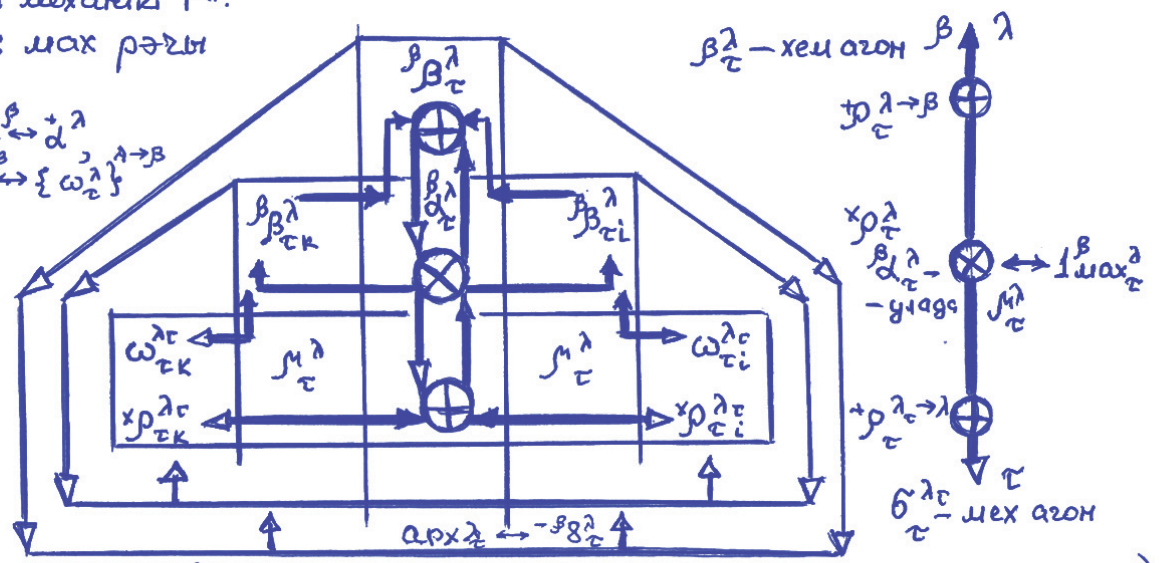


Виг  $\alpha^{\lambda}$  уключає  $\max^{\lambda}$  (у загадних, адвесних і пропаноїних ладзе) і  $\max^{\beta}$  (у загадних і загадкадних ладзе).  
 Меєци адзінак і падеў у схеме  $\alpha^{\lambda}$  нацераканы ієрархічным лікам  $\lambda^{\lambda}$ , а іх рухі (сідракі) — від механікі  $\rho^{\lambda}$ .  
 Виг  $\alpha^{\lambda}$  механікі  $\rho^{\lambda}$  у схеме  $\alpha^{\lambda}$  нагадває гістарычны (крыніны) сімвал механікі —  $\omega^{\lambda}$ , дзе знак  $\infty$  — знак баганьня, аб'емну, туману ведаў, а сідракі — знак ватэакья сідракья і разьмеркаванья (наздзяленьня меркамі, меткамі, мецамі).  
 Множаньне сімвалаў механікі рухам набудзеньня.

Рухам набудзеньня  $\rho^{\lambda} \omega^{\lambda} \rightarrow \sigma$ ,  $\omega^{\lambda} \leftrightarrow \alpha^{\lambda}$  схеме  $\alpha^{\lambda}$  мнотыцца  $\bar{\omega}$  яе змеєце: усе мецагы схемы  $\alpha^{\lambda}$  набудзюцца мець усе меркі віда  $\alpha^{\lambda}$ . Акт  $\alpha^{\lambda} | \omega^{\lambda}$  — рух асвєта тэхнічнай адзінак  $\omega^{\lambda}$  яка наздзяленьня матэматычным сімвалам у полі лікаў  $\lambda^{\lambda}$  і механікі  $\rho^{\lambda}$ .

$\alpha^{\lambda} | \omega^{\lambda}$ :  $\max \rho^{\lambda}$

$x^{\rho \beta} \omega^{\lambda} \rightarrow \sigma$ ,  $\omega^{\lambda} \leftrightarrow \alpha^{\lambda}$ ,  $\lambda \rightarrow \beta$   
 $\beta^{\lambda} \leftrightarrow \{ \omega^{\lambda} \}$



$\max^{\lambda}$  тэхнічнай рэчэ  $\omega^{\lambda}$  звязвае рухі складанья  $\rho^{\lambda} \rightarrow \lambda$  у яе механічным агоне  $\beta^{\lambda}$ , множаньня  $\rho^{\lambda}$  яе ўладу  $\alpha^{\lambda}$  і складанья  $\rho^{\lambda} \rightarrow \beta$  у яе хімерічным агоне  $\beta^{\lambda}$ .  
 Акт  $\alpha^{\lambda} | \omega^{\lambda}$  механікі  $\rho^{\lambda}$  наздзяляе рэч  $\rho^{\lambda} \omega^{\lambda} \leftrightarrow \beta^{\lambda}$  і ўсімі меркамі сказа  $\alpha^{\lambda}$ ,  $\rho^{\lambda}$  — адзінакья меркі рэчэ  $\omega^{\lambda}$ .  
 Механіка  $\rho^{\lambda}$ , дзякуючы руху множанья  $x^{\rho \beta}$  сімвалаў  $\alpha^{\lambda} \leftrightarrow \{ \alpha^{\lambda}, \alpha^{\lambda} \}$  у іх змеєце (у сьвеце  $A^{\lambda}$ ), апынаецца механікай ведаў — рухам змеєцы асноўных сімвалаў аэда  $A^{\lambda}$ .  
 Мнотыцца лік схем  $\{ \alpha^{\lambda} \leftrightarrow \{ \alpha^{\lambda}, \alpha^{\lambda} \} \}$  будзєтца новай схемат — ўладу з уздымам меркасы. Тамуючыя схема ўключає мецагы поля зк ае механічным агон.

$\beta \{ +\rho \lambda \tau \rightarrow \lambda, \chi \rho \lambda, +\rho \lambda \rightarrow \beta \} \tau$  - акти  $\beta \text{маха} \tau^\lambda$

Ієрархічная сістэма  $\beta \tau \chi^\lambda \leftrightarrow \beta \omega \tau^\lambda$  - вынік руху множаньня крыніцы  $\omega \omega^\lambda \leftrightarrow \alpha^\lambda \leftrightarrow \omega \text{пан} \omega^\lambda$  свету  $A^\lambda$ . Сістэма  $\beta \tau \chi^\lambda$  уключае яе ўладу  $\beta \text{пан} \omega^\lambda \leftrightarrow \beta \omega \tau^\lambda \leftrightarrow \beta \omega \tau^\lambda$ , механічны агон  $\beta \text{мех} \tau^\lambda \leftrightarrow \beta \omega \tau^\lambda$  і хімерны агон  $\beta \text{хем} \tau^\lambda \leftrightarrow \beta \omega \tau^\lambda$  звязаныя актымі яе  $\beta \text{маха} \tau^\lambda$ :

$$\beta \rho \tau^\lambda \longleftrightarrow \beta \text{маха} \tau^\lambda$$

$$\beta \{ +\rho \sigma \rightarrow \omega \longrightarrow \chi \rho \omega \rightarrow \sigma \longrightarrow +\rho \lambda \rightarrow \beta \} \tau_i$$

$$\beta \omega \tau^\lambda \longleftrightarrow \{ \{ \beta \omega_k^\lambda \otimes \tau_k^\lambda \} \oplus \tau^\lambda \} \tau_i \longrightarrow \{ \alpha^\lambda \otimes \tau_i^\lambda \} \longrightarrow \{ \{ \beta \tau_i^\lambda \otimes \tau_i^\lambda \} \oplus \tau_i^\lambda \} \tau_i \longleftrightarrow \beta \omega \tau^\lambda$$

$1 \beta \text{маха} \tau^\lambda$  - і-ты мах адзінкі  $\beta \tau \chi^\lambda$ ,  $\beta i^\lambda \leftrightarrow \beta \{ 1, \dots, 10 \}^\lambda$   
 $\rho i^\lambda \leftrightarrow \rho 10^\lambda \leftrightarrow \rho \mu 10^\lambda$  - 10 ты кон руху  $\rho \tau^\lambda$  мернасьці  $\beta \tau^\lambda \leftrightarrow \omega^\lambda$  - мята  $\rho \tau^\lambda$ , колькасць  $\beta \text{маха} \tau^\lambda$  якія мота выканаць адзінка  $\beta \tau \chi^\lambda$  за яе век у метках мернасьці  $\beta \tau^\lambda$ , мера асновы яе хемалона  $\beta \tau^\lambda$  і асновы яе памяці  $\beta \tau^\lambda$ .

Акт  $\beta \tau \chi^\lambda \rightarrow \lambda$  сызвае адзінкі  $\{ \omega_i^\lambda \}$  з поля  $A^\lambda$  у мехазон  $\beta \tau^\lambda$  і ўздымае мернасьць  $\beta \omega \tau^\lambda$ .

Туманны нумар  $\tau^\lambda$  адзінкі  $\omega_i^\lambda$  у агоне  $\beta \tau^\lambda$  змяняецца на  $\omega^\lambda$ . Шычуае мяца адзінкі  $\omega_i^\lambda$  у полі  $A^\lambda$  мяціцца нумарам  $\tau^\lambda \leftarrow \lambda \tau$ . Гэта мяца займае адна з адзінак  $\{ \omega_i^\lambda \}$  зых меркі  $\{ \mu_i^\lambda \}$  аказваюцца ў згодненні з меркамі  $\tau^\lambda$  мацней за меркі адзінак  $\{ \omega_i^\lambda \}$  якія ілкнуцца ў гэта мяца (іх рух у  $\rho \tau^\lambda$  - згаляе хмары сістэм з поля  $A^\lambda$  да мехазона  $\beta \tau^\lambda$  адзінкі  $\beta \tau \chi^\lambda$ ). Такім чынам узнікае рух  $\chi \rho \omega \leftarrow \lambda \tau$  гон руху  $\alpha$ -набугэння адзінак  $\{ \omega_i^\lambda \}$  згодна з цягам  $\tau^\lambda \leftarrow \lambda \tau$  уладу  $\alpha^\lambda$ .

Мэта сістэм  $\rho \{ \omega_i^\lambda \leftarrow \lambda \tau \}$ ,  $\chi \tau^\lambda \leftrightarrow \rho \{ 1, \dots, k, \dots \}^\lambda \leftarrow \lambda \tau$  у зоне  $\chi \rho \omega \leftarrow \lambda \tau$  - мяца нумар  $\rho \tau^\lambda$  метань  $\lambda$ : змяніцца на адзінку туману  $\beta \tau^\lambda$  метань  $\lambda$ , рух  $\chi \rho \omega \leftarrow \lambda \tau$  - рух загадаў сістэм  $\beta \alpha^\lambda$  - татальнай уладу поля  $A^\lambda$ .

Гон  $\chi \rho \omega \leftarrow \lambda \tau$  - хваля рухаў змены мяца, нумару і мернасьці адзінак поля  $A^\lambda$ . Гэта хваля ідзе ад  $\rho \tau \chi^\lambda$  у поле  $A^\lambda$  і сызвае рэчы  $\{ \omega_i^\lambda \}$  да  $\beta \tau \chi^\lambda$  - да мяца ў  $A^\lambda$ , нумарова кона руху  $\alpha$ -набугэння. Камі рэчы  $\beta \tau \chi^\lambda$  змяняе яе мяца ў  $A^\lambda$  гон захоўвае лічынае мяца як мэта руху. Мерка  $\chi \tau^\lambda \leftrightarrow \tau^\lambda \leftarrow \lambda \tau$  - туманная колькасць рухаў у зоне (яго капец) азначае кантакт гэтага кона з навакольным светам  $\beta \text{хэт} \tau^\lambda$  сістэм  $\beta \tau \chi^\lambda$ . Кірунак гона мота змяніцца на вачольным светам  $\omega$  і сістэм  $\beta \tau^\lambda$  (у яго выміку гон змяняецца на яго стокам з  $\beta$ -сістэмай у полі  $\beta^\lambda$  (у яго выміку гон змяняецца на яго рэха).

Адзінка  $\beta \omega \tau^\lambda$  у агоне  $\beta \tau^\lambda$  - нумары кон варгі рухаў шкотанна  $\beta \otimes \tau^\lambda$  рэгаў  $\beta \omega \tau^\lambda$  агона  $\beta \tau^\lambda$  на  $\beta \omega \tau^\lambda$ . Гэта варга змяняе нумары адзінак  $\{ \omega_k^\lambda \}$  і мернасьці  $\beta \tau^\lambda$ . У канцы варгі адзінка  $\beta \omega \tau^\lambda$  змяняе нумар  $\tau^\lambda$  назначавы нумар  $(10+1)^\lambda$ . Адзінка  $\beta \omega_{10+1}^\lambda$  - 10 кон рухаў шкотанна  $\beta \otimes \tau^\lambda$  у агоне  $\beta \tau^\lambda$ .

Рухі  $\{ \beta \otimes \tau^\lambda \}$  - стэкі сістэм  $\{ \omega_k^\lambda \}$  якія змяняюць і хімернасьць (лад).  
 Ортладу  $\beta \text{хэт} \tau^\lambda$  агона  $\beta \tau^\lambda$  узнікае ў  $\beta \omega \tau^\lambda$  і рухаецца ў згаданай варзе да 10-га кона, смядаюцца ў згодным мернасьці ў рэгам  $\{ \omega_k^\lambda \}$ . Мера орта  $\beta \tau^\lambda$  змяняецца з  $\beta \text{хэт} \tau^\lambda$  (у нумары кона) на  $\beta \text{хэт} \tau^\lambda$  (у метках рэчы  $\omega_k^\lambda$ ):

$$\beta \otimes \tau^\lambda \leftrightarrow +\rho \lambda \tau \rightarrow \lambda : \{ \beta \omega_k^\lambda \otimes \tau_k^\lambda \} \tau_i \longrightarrow \{ \beta \tau_i^\lambda \} \oplus \tau_i \longrightarrow \beta \tau_{10}^\lambda \tau_i,$$

$k \leftrightarrow \{ 0, \dots, 10 \}^\lambda$ ,  $\rho 10^\lambda$  - мера агона  $\beta \tau^\lambda$  (колькасць у агоне сістэм  $\omega_k^\lambda$  і колькасць рухаў у і-м акце яго сьцэганна).

Акт множення  $\beta \otimes_{\tau_i}^{\lambda}$  змінює 10-ти кон орто  $\beta_{\tau_i}^{\lambda} \otimes_{10}$  (адзінку  $\beta_{\omega_{10+1}}^{\lambda}$  агона  $\beta_{\tau}^{\lambda}$ ) на сітэмю  $\beta_{\tau_i}^{\lambda}$  — татаьную ўладу агона  $\beta_{\tau}^{\lambda}$ ;  $i$ -ти раз множыць сітэмю  $\beta_{\tau}^{\lambda} \leftrightarrow \beta_{\text{пан}}^{\lambda}$ , а мех агон  $\beta_{\tau}^{\lambda}$  вяртае ў лічубную мернаць.

Вонкі акта  $\beta \otimes_{\tau_i}^{\lambda}$  —  $i$ -я адзінка туману  $\beta_{\tau_i}^{\lambda}$ . Яна ўзнікае зашэтравы  $\beta_{\omega_{10+1}}^{\lambda}$  ( $\nu \rightarrow 10+1$ ) аг зменнай уздымай мернаць орто  $\beta_{\tau_i}^{\lambda}$  ў яе механ.

Адзінка  $\beta_{\tau_i}^{\lambda}$  мае мерку  $1 \text{анг}^{\lambda} / 1 \text{міг}^{\lambda}$ .

Раз  $\beta_{\tau_i}^{\lambda}$  узнікае на меху ўладу  $\beta_{\tau(i-1)}^{\lambda}$  і сеоўвае яе ў поце  $A^{\lambda}$  на  $1 \text{анг}^{\lambda} / 1 \text{міг}^{\lambda}$

Працэ узнікнення  $\beta$ -рэгі адзінае сітэмю  $\{\beta_{\tau}^{\lambda}\}$  мехагана  $\beta_{\tau}^{\lambda}$  і звязанае з імі гоні  $\alpha$ -навуэтныя; гэты працэ актывізуе рух  $\beta$ -навуэтныя ў полі  $A^{\lambda}$ . Рух  $\beta_{\tau}^{\lambda} \leftarrow \beta_{\tau}^{\lambda} \leftarrow \beta_{\tau}^{\lambda}$  мае  $\beta_{\tau}^{\lambda}$  гонаў  $(\beta_{\tau}^{\lambda})^{\lambda}$  колькасць адзінак поце  $A^{\lambda}$  якія ў міг узнікнення  $\beta$ -сітэмю мехі з ёй кантакт і адзінацьев).

Калі  $\beta$ -сітэмю рухаецца ад яе крыніцы  $\beta_{\tau}^{\lambda}$  у поле туману  $\beta^{\lambda}$ , адзінкі поце  $A^{\lambda}$ , адвэгнутае працэсам яе ўзнікнення, адзінацьча назад (вэртаюцца) і ўзнікае  $\beta_{\tau}^{\lambda}$  гонаў  $\beta_{\tau}^{\lambda} \leftarrow \beta_{\tau}^{\lambda} \leftarrow \beta_{\tau}^{\lambda}$ . Кірунак руху рэгі  $\beta_{\tau}^{\lambda}$  у полі  $A^{\lambda}$  да зоні туману  $\beta^{\lambda}$  азначаецца яе кантактамі з  $A^{\lambda}$ ; сітэмю  $\beta_{\tau}^{\lambda}$  рухаецца ў кірунку дзе меней адзінак поце  $A^{\lambda}$  (у зоне  $\beta^{\lambda}$  поце  $A^{\lambda}$  знікае).

Адзінка туману  $\beta_{\tau_i}^{\lambda} \leftrightarrow \beta_{\text{хем}}^{\lambda}$  можа атрымаць мехагон  $\beta_{\tau_i}^{\lambda}$  ад яе крыніцы  $\beta_{\tau}^{\lambda}$  і апынуцца хімеронам  $\beta_{\text{хем}}^{\lambda}$ .

Хімерон — імітацыя рэгі  $\beta_{\tau}^{\lambda}$ . Ён мае туманную ўладу  $\beta_{\tau_i}^{\lambda} \leftrightarrow \beta_{\tau_i}^{\lambda}$  і ўлавы хем агон  $\beta_{\tau_i}^{\lambda}$  (дзе сьвэваюцца вонкі яго махаў  $\beta_{\tau_i}^{\lambda}$ ). У механ уладу  $\beta_{\tau_i}^{\lambda} \leftrightarrow \beta_{\tau_i}^{\lambda} \leftrightarrow \beta_{\tau_i}^{\lambda} \leftrightarrow \beta_{\tau_i}^{\lambda}$  хімерон  $\beta_{\text{хем}}^{\lambda}$  мае і паміць  $\beta_{\tau_i}^{\lambda}$ .

Паміць хімерона, як і паміць усекай  $\beta$ -сітэмю, ўключваецца ў поле паміць  $\beta_{\tau_i}^{\lambda}$  яго крыніцы  $\beta_{\tau}^{\lambda}$  дзе звязваецца з улавай паміцью сітэмю  $\beta_{\tau}^{\lambda}$ . Хімеронот маюць велькіе значэньне ў полі паміць і крыніц, якія азначаюць новыя кірункі поце  $A^{\lambda}$  і могуць звязвацца з тэхнічнымі адзінкамі ствараюць новыя сітэмю поце  $\beta^{\lambda}$ .

Асноўная мэта зьвязайных  $\beta$ -сітэм хемалона  $\beta_{\tau}^{\lambda}$  рэгі  $\beta_{\tau}^{\lambda}$  — іх стаць з хемалонамі іх нававольнага свету — поце  $\beta_{\tau}^{\lambda}$ , дзе ўзнікае новая ўлада свету  $A^{\lambda}$ :

$$\beta \otimes_{\tau_i}^{\lambda} \leftrightarrow \beta_{\omega}^{\lambda} \rightarrow \sigma, \tau_i : \{ \beta_{\tau_i}^{\lambda} \leftrightarrow \beta_{\omega_{10+1}}^{\lambda} \} \otimes \alpha_{\tau}^{\lambda} \rightarrow \{ \beta_{\tau_i}^{\lambda} \leftrightarrow \beta_{\tau_i}^{\lambda} \},$$

$\beta_{\tau_i}^{\lambda} \rightsquigarrow \beta_{\text{хем}}^{\lambda}$ ,  $\rightsquigarrow$  — знак малгомага руху.

Акт складаньня  $\beta \oplus^{\lambda} \rightarrow \beta$  вклонваецца ў хемалона  $\beta_{\tau}^{\lambda}$  адзінкі  $\beta_{\omega_{\tau}}^{\lambda}$  дзе рэгі  $\beta_{\tau_i}^{\lambda}$  (вонкі  $i$ -га акта множыму ўладу  $\beta_{\tau}^{\lambda}$  сітэмю  $\beta_{\omega_{\tau}}^{\lambda}$ ) мае стаць  $\beta_{\tau_i}^{\lambda}$  з  $\beta$ -сітэмю хемалона  $\beta_{\tau}^{\lambda}$  і хемалонаў  $\{\beta_{\tau}^{\lambda}\}$  адзінае  $\beta_{\omega_{\tau}}^{\lambda}$  поце  $\beta_{\tau}^{\lambda}$ . Стаць ўздымаюць мернаць  $\beta$ -рэгі, а орты  $\beta_{\tau}^{\lambda}$  стаць.

$$\beta \oplus_{\tau_i}^{\lambda} \rightarrow \beta \leftarrow \beta_{\omega}^{\lambda} : \{ \beta_{\tau_i}^{\lambda} \otimes_{\tau_i}^{\lambda} \} \rightarrow \{ \beta_{\tau_i}^{\lambda} \oplus_{\tau_i}^{\lambda} \} \rightarrow \beta_{\tau_i}^{\lambda},$$

$$\beta \oplus_{\tau_i}^{\lambda} \rightarrow \beta \leftarrow \beta_{\omega}^{\lambda} : \{ \beta_{\tau_i}^{\lambda} \} \leftrightarrow \{ \beta_{\tau_i}^{\lambda} \}$$

Сітэмю паміць  $\beta_{\tau}^{\lambda}$ ;  $\beta_{\tau}^{\lambda}$  — рэгі ўпрацэсай працэсам якія ідуць у мернаць,  $\beta_{\tau}^{\lambda}$  імітацыя поце працэсам і паміць навуці — аптоўны сітэмю. Іх рух у паміць абганьне дзе рухі поце працэсам і дае малгомагаць разліваць змены поце працэсам і рыхтаваць яго сімвал — новую ўладу.

$$\alpha^\lambda | \rho_\tau^\lambda \leftrightarrow \{ \rho_{\beta \rightarrow \omega}^{\lambda \tau}, \rho_{\omega \rightarrow \beta}^{\lambda \tau}, \rho_{\beta \rightarrow \omega}^{\lambda \tau} \}$$

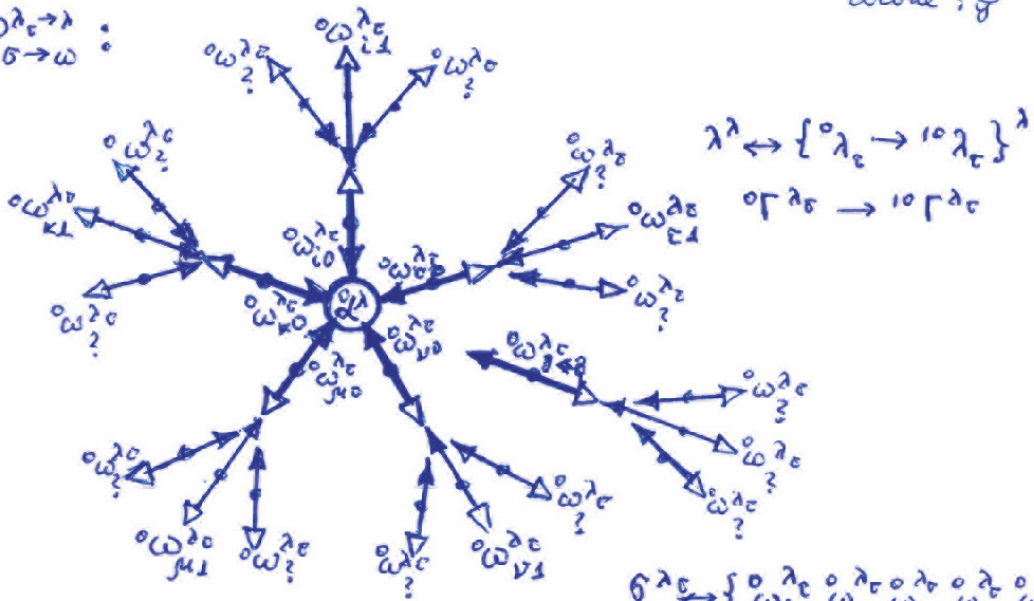
$$\lambda \leftrightarrow \lambda$$

$$\{ \rho_{\beta \rightarrow \omega}^{\lambda \tau} \} \leftrightarrow \rho_{\beta \rightarrow \omega}^{\lambda \tau}$$

$$\omega_\tau^\lambda \leftrightarrow \omega^\lambda$$

$$\sigma_{\tau}^{\lambda \sigma} \leftrightarrow \sigma_{\lambda \sigma}$$

рух технічної адзінай і змены поля  $A^{\lambda \sigma}$   
 $\bar{y}$  - яе механічныя  
 аломе;  $\bar{y}$



$$\lambda^\lambda \leftrightarrow \{ \rho_{\beta \rightarrow \omega}^{\lambda \tau} \}^\lambda$$

$$\sigma_{\tau}^{\lambda \sigma} \rightarrow \rho_{\lambda \sigma}$$

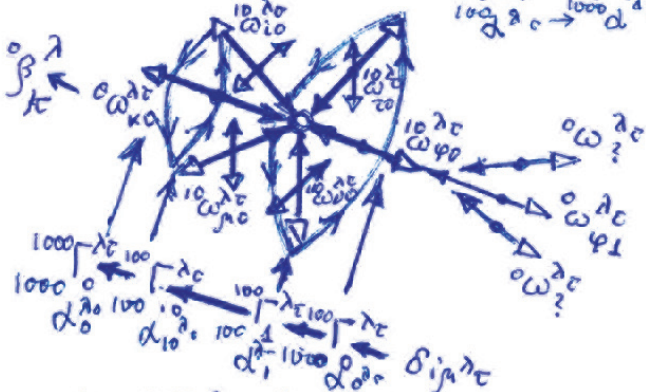
$$\sigma_{\tau}^{\lambda \sigma} \leftrightarrow \{ \omega_{\tau \omega}, \omega_{\tau \omega_0}, \omega_{\tau \omega_1}, \omega_{\tau \omega_2}, \omega_{\tau \omega_3}, \omega_{\tau \omega_4}, \omega_{\tau \omega_5}, \omega_{\tau \omega_6}, \omega_{\tau \omega_7}, \omega_{\tau \omega_8}, \omega_{\tau \omega_9} \}$$

$$\text{mag}_{\tau}^{\lambda \sigma} \leftrightarrow \beta 10^{\lambda \sigma}$$

$$\lambda_\tau \leftrightarrow \{ 100 \lambda_\tau \rightarrow 1000 \lambda_\tau \}^\lambda$$

$$100 \rho_{\lambda \sigma} \rightarrow 1000 \rho_{\lambda \sigma}$$

$$100 \alpha_{\lambda \sigma} \rightarrow 1000 \alpha_{\lambda \sigma}$$



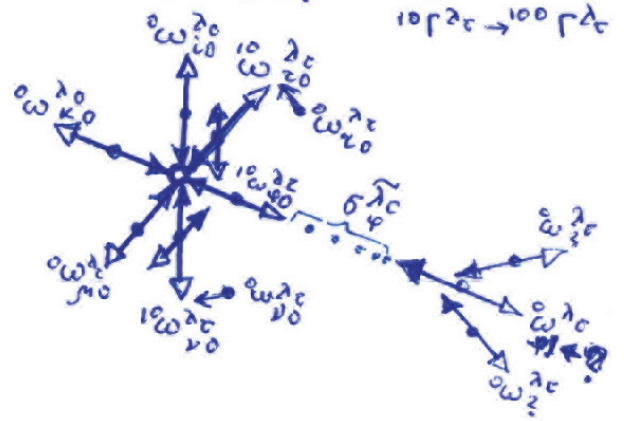
$$\sigma_{\tau}^{\lambda \sigma} \leftrightarrow \{ \omega_{\tau \omega}, \omega_{\tau \omega_0}, \omega_{\tau \omega_1}, \omega_{\tau \omega_2}, \omega_{\tau \omega_3}, \omega_{\tau \omega_4}, \omega_{\tau \omega_5}, \omega_{\tau \omega_6}, \omega_{\tau \omega_7}, \omega_{\tau \omega_8}, \omega_{\tau \omega_9} \}$$

$$\dots \omega_{\tau \omega_{10}} \rightarrow 1000 \omega_{\tau \omega_{10}} \}$$

$$\leftrightarrow \{ 100 \rho_{\lambda \sigma}, 100 \rho_{\lambda \sigma}, \dots, 100 \rho_{\lambda \sigma} \} \rightarrow \rho_{\lambda \sigma}$$

$$\lambda_\tau \leftrightarrow \{ 10 \lambda_\tau \rightarrow 100 \lambda_\tau \}^\lambda$$

$$10 \rho_{\lambda \sigma} \rightarrow 100 \rho_{\lambda \sigma}$$



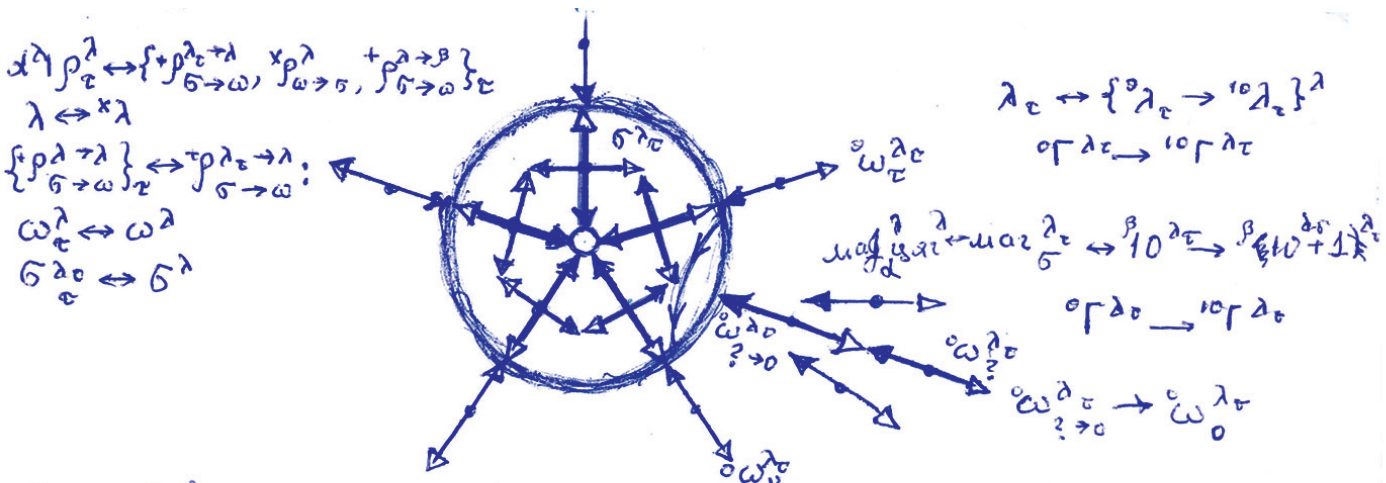
$$\sigma_{\tau}^{\lambda \sigma} \leftrightarrow \{ \omega_{\tau \omega}, \omega_{\tau \omega_0}, \omega_{\tau \omega_1}, \omega_{\tau \omega_2}, \omega_{\tau \omega_3}, \omega_{\tau \omega_4}, \omega_{\tau \omega_5}, \omega_{\tau \omega_6}, \omega_{\tau \omega_7}, \omega_{\tau \omega_8}, \omega_{\tau \omega_9} \}$$

$$\dots \omega_{\tau \omega_{10}}, \omega_{\tau \omega_{11}}, \omega_{\tau \omega_{12}}, \omega_{\tau \omega_{13}} \}$$

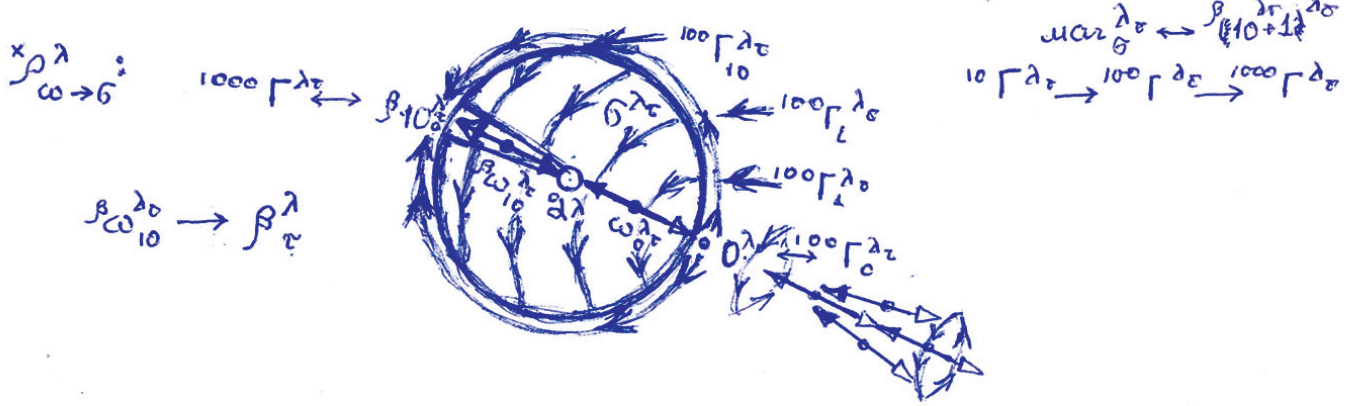
$$\text{mag}_{\tau}^{\lambda \sigma} \leftrightarrow \beta (10+1)^\lambda$$

Схема  $\alpha^\lambda | \rho_\tau^\lambda, \{ \rho_{\beta \rightarrow \omega}^{\lambda \tau} \}$  - працэе ацязьвання сістэм  $\{ \omega_{\tau \omega}^{\lambda \sigma} \}$  свету  $A^{\lambda \sigma}$  у механічныме  
 аломе  $\beta$  адзінай  $\omega^\lambda \leftrightarrow \omega_\tau^\lambda$ , уздымну мернасьці  $\beta 10^{\lambda \sigma}$  у аломе  $\beta$  адзінай  $\beta$ -сістэмы.  
 Трацэе  $\rho_{\beta \rightarrow \omega}^{\lambda \tau}$  актывізуецца ўключэннем у мехалон новай сістэмы  $\omega_{\tau \omega}^{\lambda \sigma}$ . У вострыку  
 магнітуда  $\text{mag}_{\tau}^{\lambda \sigma}$  мехалона змяняецца з  $\beta 10^{\lambda \sigma}$  (гэта мэтае магнітудае мех аломе) на  
 $\beta (10+1)^\lambda$ . Сістэмы мехалона адзінаюцца ад новай адзінай  $\omega_{\tau \omega}^{\lambda \sigma} \leftrightarrow \omega_{\tau \omega}^{\lambda \sigma}$ . Іх  
 зьіны - зьіны, якія маюць новую мернасьць  $10^{\lambda \sigma}$ . Мернасьці ськладваюцца ў мехал  
 орты  $\{ 100 \rho_{\lambda \sigma} \}$ , а ськладанне орты  $\{ 100 \rho_{\lambda \sigma} \}$  зь адзе зь орты  $1000 \rho_{\lambda \sigma}$ . Орты  $1000 \rho_{\lambda \sigma}$  зьіны іх  
 мекал сістэмы  $\omega_{\tau \omega}^{\lambda \sigma}$ , які і будзе адзінай тыману  $\beta$ .  
 Сістэмы  $\{ \omega_{\tau \omega}^{\lambda \sigma} \}$  - меканічны мехалона  $\beta$  і нульвога концы гонай руху навузэнны  
 полі  $\beta$  ад свету  $A^{\lambda \sigma}$ . Гон руху навузэнны  
 $\alpha^\lambda \rho_\tau^\lambda \leftrightarrow \{ \rho_{\beta \rightarrow \omega}^{\lambda \tau} \}$  :  $\omega_{\tau \omega}^{\lambda \sigma} \rightarrow \{ \omega_{\tau \omega_1}^{\lambda \sigma}, \dots, \omega_{\tau \omega_n}^{\lambda \sigma}, \dots \}$

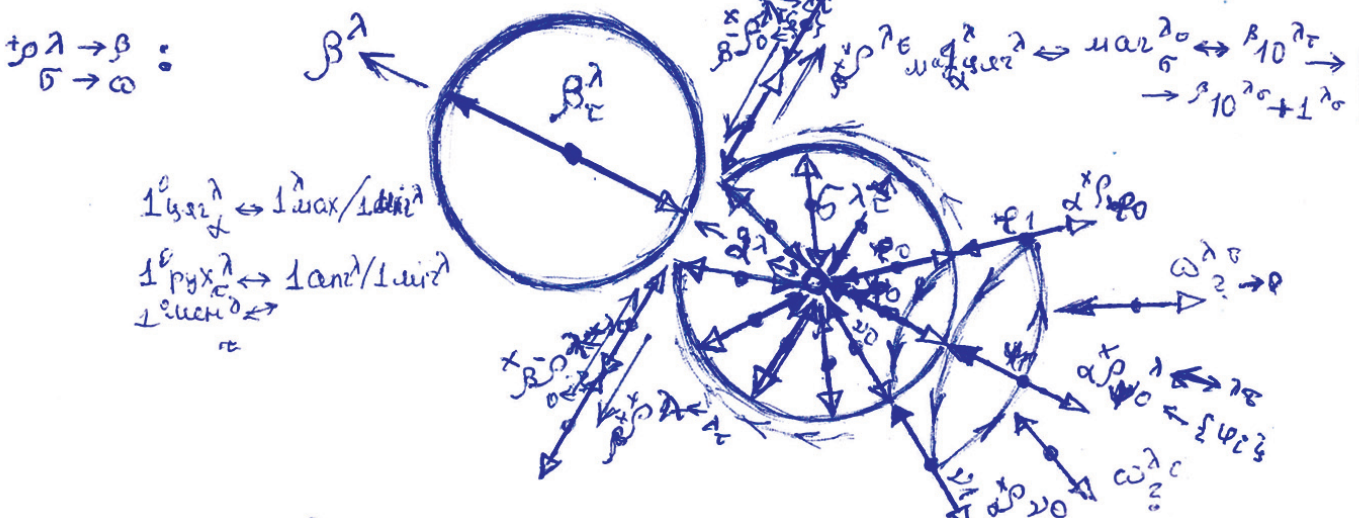
уздыкна камі  $\omega_{\tau \omega}^{\lambda \sigma}$  уключэнне  $\bar{y}$  змее  $\beta$  адзінай сістэмы  $\omega^\lambda$ , а яе меканічны мекан  $\beta$   
 займае адна з  $\beta$  сістэм  $\{ \omega_{\tau \omega}^{\lambda \sigma} \}$ . Сістэмы  $\{ \omega_{\tau \omega}^{\lambda \sigma} \}$  - вальныя ад нушару  
 мехалона  $\beta$  і ўсе яны і меканічныя ўключэнне  $\bar{y}$  мехалон (у іх полі мэтае).



Система  $\omega_{\tau}^{\lambda_0} \rightarrow 0$  уключається в механон  $\sigma_{\tau}^{\lambda_0}$  адзінкі  $\omega^{\lambda}$ . Системи  $\{ \omega_{\tau}^{\lambda_0} \}$  механона  $\sigma_{\tau}^{\lambda_0}$  адзінаюцца,  $\max_{\tau}^{\lambda_0} \leftrightarrow \beta_{\tau}^{\lambda_0}$  змяняецца на  $\max_{\tau}^{\lambda_0} \leftrightarrow \beta_{\tau}^{\lambda_0} (10+1)^{\lambda_0}$  і актывізуецца працае змены вярнаці з  $\sigma_{\tau}^{\lambda_0} \rightarrow \{ \sigma_{\tau}^{\lambda_0} \}$ .

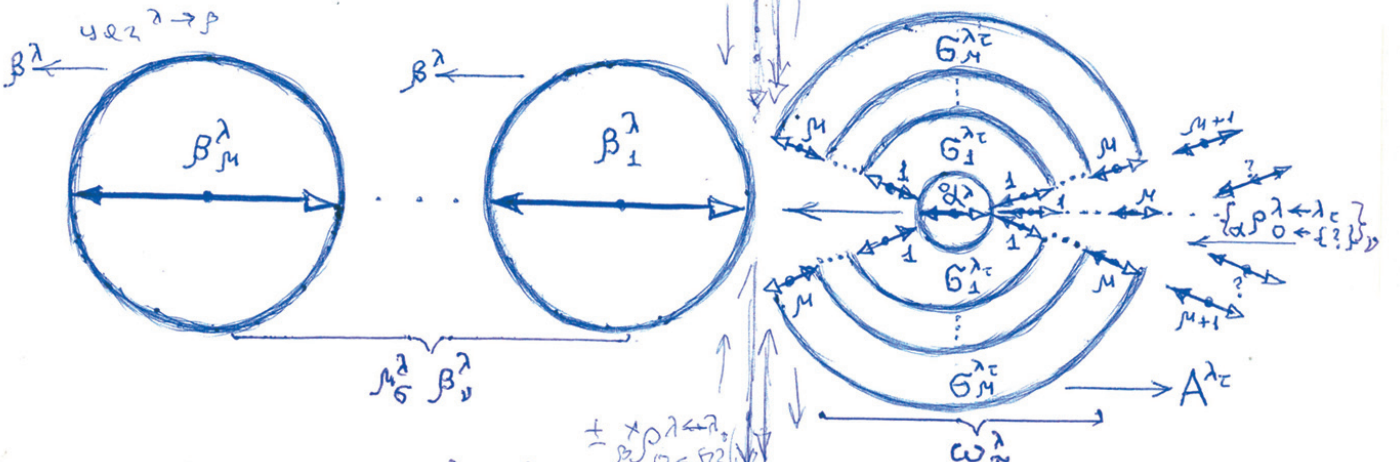
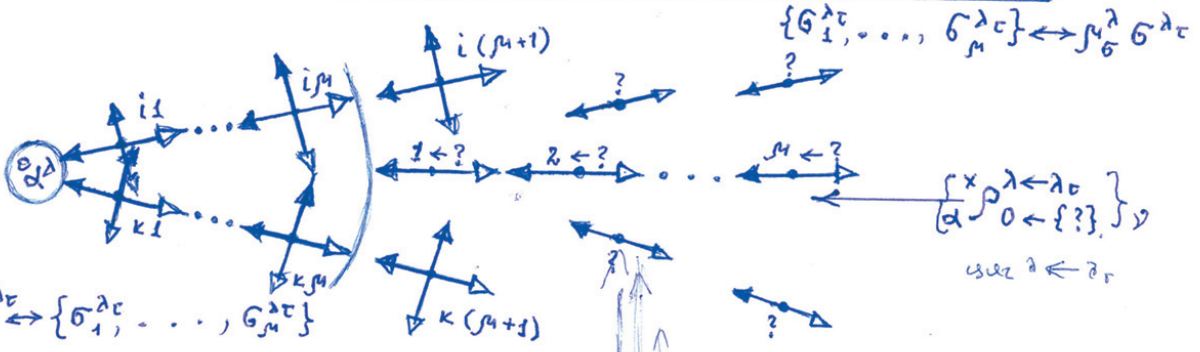
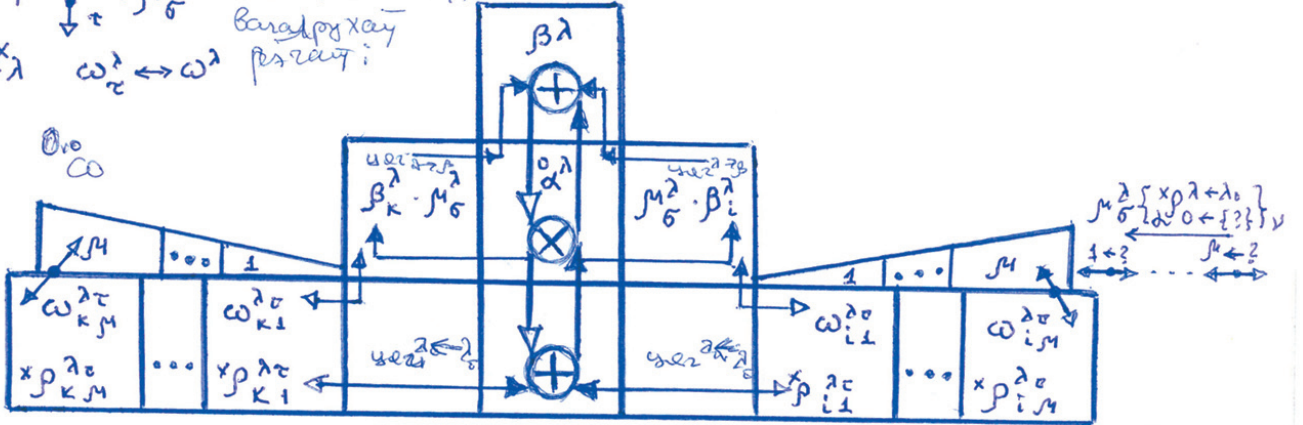


Систэма  $\sigma_{\tau}^{\lambda_0} \rightarrow 0$  апінаецца кучавым конам руху змены мерцаці ў механоне  $\sigma_{\tau}^{\lambda_0}$ , метабы кон  $\omega_{\tau}^{\lambda_0}$  - адзінка ў якой стыкуюцца орты  $\beta_{\tau}^{\lambda_0}$ . Гэта адзінка змяняе механь з  $\lambda_{\tau}$  на  $\lambda$  і апінаецца адзінкай туману  $\beta_{\tau}^{\lambda_0}$  сістэмы  $\omega^{\lambda}$  - вонікам руху множання яе ўлады  $\alpha^{\lambda}$ .



Адзінка туману  $\beta_{\tau}^{\lambda_0}$  - вонік множання ўлады  $\alpha^{\lambda}$  сістэмы  $\omega^{\lambda} \leftrightarrow \omega_{\tau}^{\lambda_0}$ ;  $\beta_{\tau}^{\lambda_0}$  узнікае ў месцы ўлады  $\alpha^{\lambda}$  і рухае сістэму  $\alpha^{\lambda}$  і механічны агон  $\sigma_{\tau}^{\lambda_0}$  на  $\perp$  ан  $\alpha^{\lambda}$  у поле  $\beta_{\tau}^{\lambda_0}$ . Выкат  $\beta$  - сістэмы актывізуе рухі  $\{ \rho_{\tau}^{\lambda_0} \}$  полі  $\sigma_{\tau}^{\lambda_0}$  - адзінакне сістэмы  $\{ \omega_{\tau}^{\lambda_0} \}$  адзінкі  $\beta_{\tau}^{\lambda_0}$  і вяртанне іх на лічунныя месцы ў гонак механона  $\sigma_{\tau}^{\lambda_0}$ .  $\beta$  - сістэма рухаецца ў поле іерархічнага туману  $\beta^{\lambda}$  дзе выконваюцца стыкі  $\beta$ -зон, і рух складанне  $\rho_{\tau}^{\lambda_0} \rightarrow \beta$ . А сістэма  $\omega_{\tau}^{\lambda_0}$  ўключае ў мех агон новую сістэму поле  $\beta_{\tau}^{\lambda_0}$  і вонікае новай  $\max_{\tau}^{\lambda_0} \leftrightarrow \{ \oplus \lambda_{\tau}^{\lambda_0}, \otimes \lambda, \oplus \lambda \rightarrow \beta \}_{\tau}$ .

$\alpha^{\lambda} | \begin{matrix} \omega^{\lambda} \\ \downarrow \\ \tau \end{matrix} - \mu^{\lambda} \sigma$  *у системі  $\bar{y}$  механізму, коли механізм, вважатися рідким;*  
 $\lambda \leftrightarrow \lambda \quad \omega^{\lambda} \leftrightarrow \omega^{\lambda}$



Механізм  $\sigma^{\lambda \tau} \leftrightarrow \beta^{\lambda \tau}$  системи  $\omega^{\lambda} \leftrightarrow \omega^{\lambda}$  уключає  $\mu^{\lambda} \sigma^{\lambda \tau}$  коло:  $\mu^{\lambda} \cdot \sigma^{\lambda \tau} \leftrightarrow \{ \sigma_1^{\lambda \tau}, \sigma_2^{\lambda \tau}, \dots, \sigma_m^{\lambda \tau} \}$ ,  $\sigma_0^{\lambda \tau} \leftrightarrow \alpha^{\lambda}$  - коло  $\beta^{\lambda \tau}$ ,  $\{ \beta_1^{\lambda \tau}, \dots, \beta_m^{\lambda \tau} \}$  - коло адзінак  $\{ \omega^{\lambda \tau} \}$ . Адзінки  $\{ \omega^{\lambda \tau} \}$ ,  $\nu \leftrightarrow \{ 1, \dots, m \}$  можуть абмінювати їх уздовж мернаєці (їх орбіти  $\sigma^{\lambda \tau}$  мають етикі). Адзінки  $\{ \omega^{\lambda \tau} \}$  аполіаються за механізм зони адміну  $\beta^{\lambda \tau}$ .

Вала  $\mu^{\lambda} \sigma^{\lambda \tau}$  агоніа  $\beta^{\lambda \tau}$  адзінак магнітуду заргі (зв'язна) махаю  $\{ \alpha^{\lambda} \rho^{\lambda} \}$  системою  $\omega^{\lambda}$ . Зарга махаю  $\{ \alpha^{\lambda} \rho^{\lambda} \}$  стварає адміну  $\mu^{\lambda} \sigma^{\lambda \tau}$  адзінак  $\{ \omega^{\lambda \tau} \}$  полярності  $A^{\lambda \tau}$ . Мера  $\beta^{\lambda \tau}$  заргі махаю - магнітуда зв'язна рухаю набув'єння  $\{ \alpha^{\lambda} \rho^{\lambda} \}$  - мера (двумірна) хвали вандруєння маду  $\bar{y}$  полярності  $A^{\lambda \tau}$ .

Вонік двійнаєці заргі махаю  $\mu^{\lambda} \sigma^{\lambda \tau}$  - зарга (кол, зв'язно)  $\beta^{\lambda \tau} \cdot \beta^{\lambda}$  хешалому  $\beta^{\lambda \tau}$  - кол (рад, зарга) адзінак туману  $\{ \beta_1^{\lambda \tau}, \dots, \beta_m^{\lambda \tau} \}$ ,  $\nu \leftrightarrow \{ 1, \dots, m \}$ .

Адзінка туману  $\beta^{\lambda \tau}$  узнікає  $\bar{y}$  воніку  $\bar{y}$  уздовж мернаєці  $\mu$ -га коло  $\beta^{\lambda \tau}$  агоніа  $\beta^{\lambda \tau}$  на місяці  $\beta^{\lambda \tau}$ , і створює  $\beta^{\lambda \tau}$  з яє механізмам на  $1 \text{ анг}^{\lambda}$  за  $1 \text{ міг}^{\lambda}$ . Новий адзінка  $\beta^{\lambda \tau}$  узнікає на новий місяці  $\beta^{\lambda \tau}$ ; і створює яє на  $1 \text{ анг}^{\lambda}$ . У каньці працєва  $\mu^{\lambda} \sigma^{\lambda \tau}$  на місяці  $\beta^{\lambda \tau}$  аполіаються адзінка  $\beta_1^{\lambda \tau}$ , а системою  $\{ \beta^{\lambda \tau}, \beta^{\lambda \tau} \}$  створюється  $\bar{y}$  адміну кіруєнку на  $\mu^{\lambda} \sigma^{\lambda \tau}$  ангаю  $\lambda$  за  $\mu^{\lambda} \sigma^{\lambda \tau}$  міг'є - двійнаєці вале колу  $\mu^{\lambda} \sigma^{\lambda \tau}$  хімертекага агоніа  $\beta^{\lambda \tau}$ . Усе рухі системою  $\omega^{\lambda \tau}$  з валою механізмам  $\mu^{\lambda} \sigma^{\lambda \tau}$  мають валу  $\mu^{\lambda} \sigma^{\lambda \tau}$ .

$\alpha^{\lambda} \rho^{\lambda} \leftarrow \lambda \sigma^{\lambda \tau}$  системою  $\omega^{\lambda \tau}$  з валою механізмам  $\mu^{\lambda} \sigma^{\lambda \tau}$  у полярності  $A^{\lambda \tau}$  роєнка ствараю  $\sigma_1^{\lambda \tau}$  адзінки  $\omega_1^{\lambda \tau}$  з валою механізмам  $\mu^{\lambda} \sigma^{\lambda \tau} \leftrightarrow 1^{\lambda}$ ;  $1^{\lambda} \leftarrow \lambda \sigma^{\lambda \tau}$  чяг  $\leftrightarrow \beta_1^{\lambda \tau} \leftarrow \lambda \sigma^{\lambda \tau}$  чяг  $\leftrightarrow \mu^{\lambda} \sigma^{\lambda \tau}$  чяг  $\leftrightarrow \lambda$ . Вонік  $\beta$ -системою вонікає магнітуду рухаю  $\{ \alpha^{\lambda} \rho^{\lambda} \}$  у полярності  $A^{\lambda \tau}$  і створює адзінки  $\{ \omega^{\lambda \tau} \}$  створює адзінки на місяці.







$\alpha^\lambda | \rho \beta^\lambda - \text{рух по } \beta^\lambda$

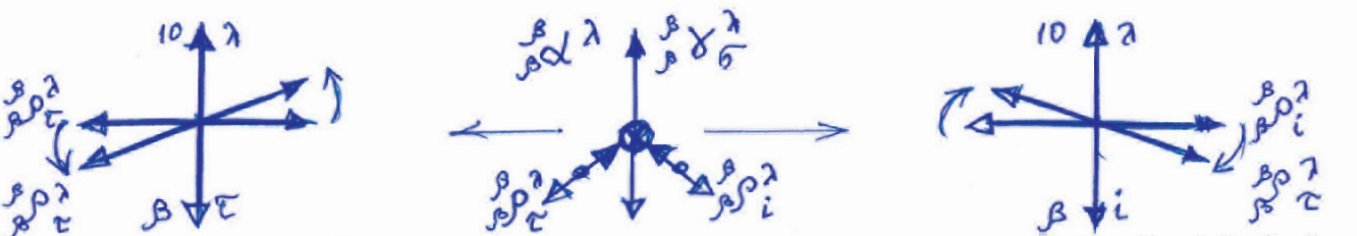
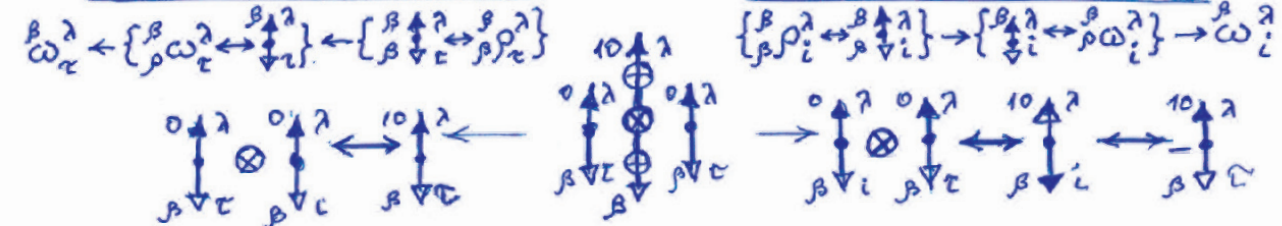
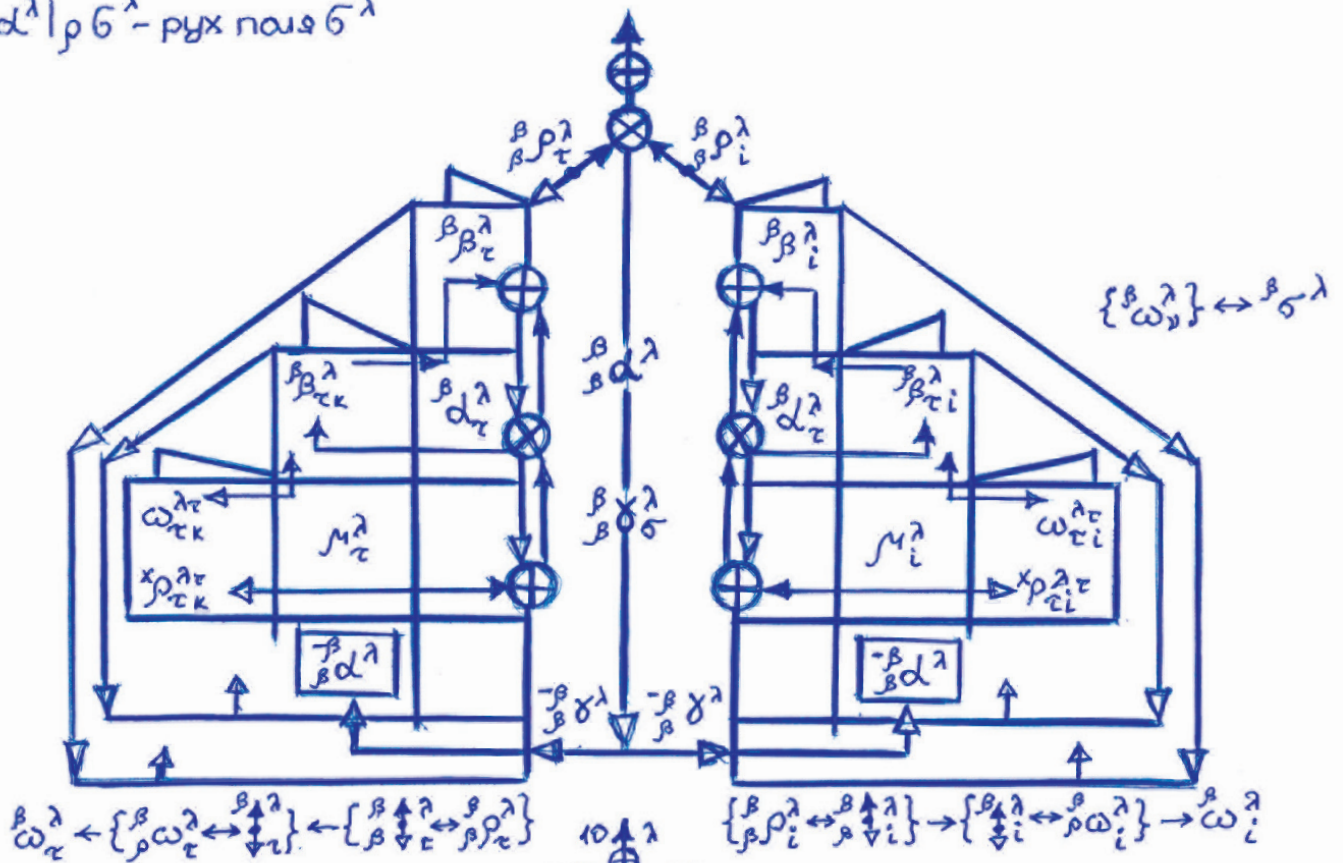


Схема  $\alpha^\lambda | \rho \beta^\lambda \leftrightarrow \rho \omega \rightarrow \sigma$ ,  $\omega^\beta \leftrightarrow \alpha^\lambda$ ,  $\beta^\beta \leftrightarrow \alpha^\lambda (\rho \beta^\lambda)$  уключае відні  $\alpha^\lambda | \omega^\lambda \leftrightarrow \alpha^\lambda \alpha^\lambda \omega^\lambda \alpha^\lambda$  рэгаў  $\omega^\lambda$  і  $\omega^\lambda$  салмутаў  $\beta$  куты. З'ява відаў - вонкі руху у метах механік  $\rho \beta^\lambda$   $x_{\tau\tau}^\beta \leftrightarrow \alpha^\lambda \rho \beta^\lambda \otimes \rho \beta^\lambda \rightarrow \alpha^\lambda \beta^\lambda \leftrightarrow \{ \alpha^\lambda \otimes \alpha^\lambda \}$

Акт  $x_{\tau\tau}^\beta$  стаку схем  $\{ \alpha^\lambda \}$  звязвае схемат-механіку іх колам: механічныя алонам  $\{ \beta^\lambda \}$ , уладані  $\{ \alpha^\lambda \}$  і  $\beta$ -палям  $\{ \beta^\lambda \}$ . Усе стыкі вонкі вонкі з узгалац колам уладані. Аемунія з іх - стыкі хем алонам  $\beta$  іх уз нікае хімерогена (туманная) уладані  $\beta \alpha^\lambda$  -  $\beta$ -уладані поля  $\beta^\lambda$ .  $\beta$ -уладані можа быць сцягані стыкі  $\beta$ -сістэм адзінак  $\{ \omega^\lambda \}$  - цыкі  $\{ \beta^\lambda \}$ . Сімвалы  $\beta$  - відаў  $\{ \beta^\lambda \}$ . Гукі - вонкі і механіку адліччу  $\beta$ -рэгаў іх махам, яны ўзнікаюць і рухаюцца  $\beta$  палям туману  $\{ \beta^\lambda \}$ . Віды працуюць у пам'яці сістэм  $\{ \omega^\lambda \}$  ці  $\{ \beta^\lambda \}$ . Мерка  $\beta$ -стыка  $\{ \rho \beta^\lambda \otimes \rho \beta^\lambda \}$  у яно механіку  $\omega^\lambda$  - вугал на які рэз  $\omega^\lambda$  мучіць павернуць стрэлку  $\beta$  махам  $\beta$ . Гэты вугал - бага рэз  $\omega^\lambda$  і  $\omega^\lambda$ . Новая мерка  $\beta \delta^\lambda \leftrightarrow \beta \alpha^\lambda$  узнікае  $\beta$  руху механіку як кобот орт іерархічнай схемат  $\{ \alpha^\lambda \otimes \alpha^\lambda \}$  дзе вонкі вонкі сцягані вуглаў (стыкаў) як іерархічна механіку  $\beta$ .

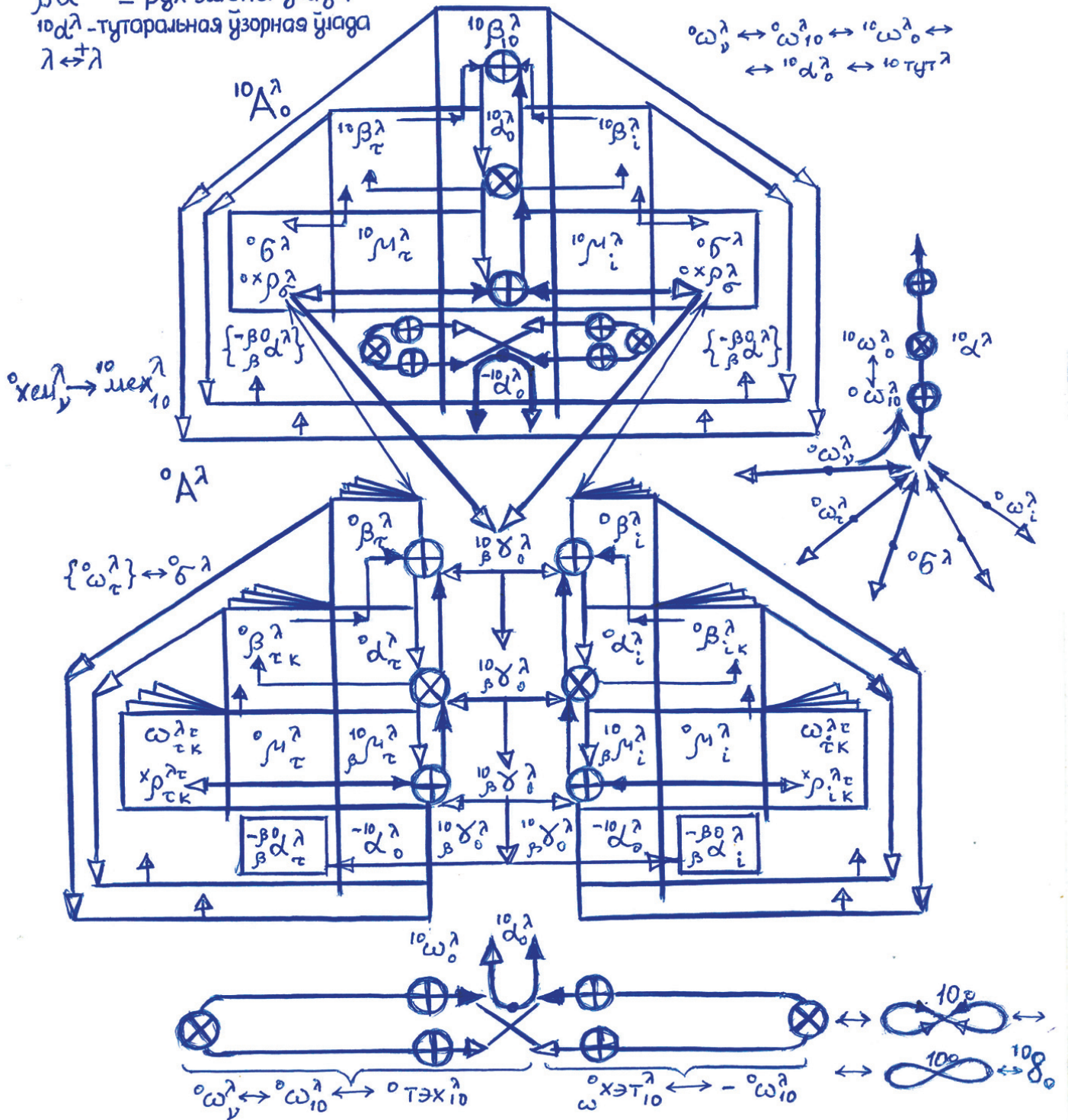
$\beta$  - ант







$\rho \alpha^\lambda \rightarrow \beta$  - рух змены ўлады  
 ${}^{10}\alpha^\lambda$  - тутаральная ўзорная ўлада  
 $\lambda \leftrightarrow \pm \lambda$



${}^{10}\omega_0^\lambda \leftrightarrow {}^{10}\alpha^\lambda \leftrightarrow {}^{10}\gamma^\lambda$  - тутаральная ўзорная ўлада ў полі б $^\lambda$ . Сістэма  ${}^{10}\gamma^\lambda$  узнікае ў межах велмулады - тэхнічнай адзінкі  ${}^{10}\omega_y^\lambda \leftrightarrow {}^{10}\omega_{10}^\lambda \leftrightarrow {}^{10}\gamma_x^\lambda$  якая выканала ўсе магчымыя  $\mu_{\alpha, \tau}$  і ўсе рэгі  $\{\omega_{\pi, \tau}^\lambda\}$  ў ме мехагоне блт змяніла на адзінкі туману  $\{\beta_{\pi, \tau}^\lambda\}$ , рухам  $\rho^\lambda \rightarrow \beta$  уздымму мернасці змяніла паміць  $\{\beta_{\pi, \tau}^\lambda\}$  і прапанавала сцяг  ${}^{10}\omega_x^\lambda \leftrightarrow {}^{10}\alpha^\lambda$  - уладу яе хімерызмага агона  $\beta^\lambda$ . Гэты сцяг кожны мноштва ў полі б $^\lambda$  рухам навузэння  ${}^{10}\omega_x^\lambda \rightarrow \sigma$ . Замест мехагона  $\beta^\lambda$  з рэкаў мінулага свету  $A^\lambda$  адзінка  ${}^{10}\omega_x^\lambda \leftrightarrow {}^{10}\alpha^\lambda$  сцягвае рэгі  $\{\omega_{\pi, \tau}^\lambda\} \leftrightarrow \sigma^\lambda$  з яе навакальняк свету  $\omega_{x_e, t}^\lambda$  у новы мехагон  $\beta^\lambda$  і рухам навузэння ўздымае іх мернасць з  $0^\lambda$  да  $\beta^{10\lambda}$  (метка  $\beta$  ў ліко  $\beta^{10\lambda}$  азначае туманнасць (хімерызмаць) новай мернасці магчымаць звароту ў мернасць  $0^\lambda$ : тутаральная ўлада - улада магчымага, прапаноўны чад, а загадвае адна татаральная ўлада);  
 ${}^{10}\omega_x^\lambda \rightarrow \sigma : \{ {}^{10}\omega_{10}^\lambda \rightarrow \beta^\lambda \} \leftrightarrow \{ {}^{10}\alpha^\lambda \rightarrow \{ \beta_{\pi, \tau}^\lambda \} \}$   
 ${}^{10}$ -ты кон тутаральнай улады  ${}^{10}\gamma^\lambda \leftrightarrow {}^{10}\text{кон}^\lambda$  змяняе загзінку загадаў  $^\lambda$  на загзінку прапаноў  $^\lambda$ .

$100\alpha^\lambda$  - тутаральная асветная ўлада  
 $\lambda \leftrightarrow +\lambda$

$100\lambda \leftrightarrow 100\tau\lambda$  - адзінка тутаральнай асветнай ўлады.  
 $100\tau\lambda$  узнікае ў полі  $10\lambda$  (у гэ мехазоне) ў межы адзінкі тутаральнай узорнай ўлады  $10\tau\lambda$ , якая прапанавава сьвяз  $-100\lambda$  сімвалаў  $\{-\beta\alpha^\lambda\}$   $\{-\alpha^\lambda\}$  памяці  $-10\lambda$ , здольны агортваць усе лінічныя мернасьці  $0\lambda$ ,  $10\lambda$  і ўнікаць у змешч сьстэмік памяці.  
 $100\tau\lambda$  змяняе мернасьці  $0\lambda$ ,  $10\lambda$  як праз іх тутаральную ўзорную ўладу гэкі ў працы кантакце, лінаючы паміць  $-10\lambda$  гэ мех агон  $10\lambda$ .

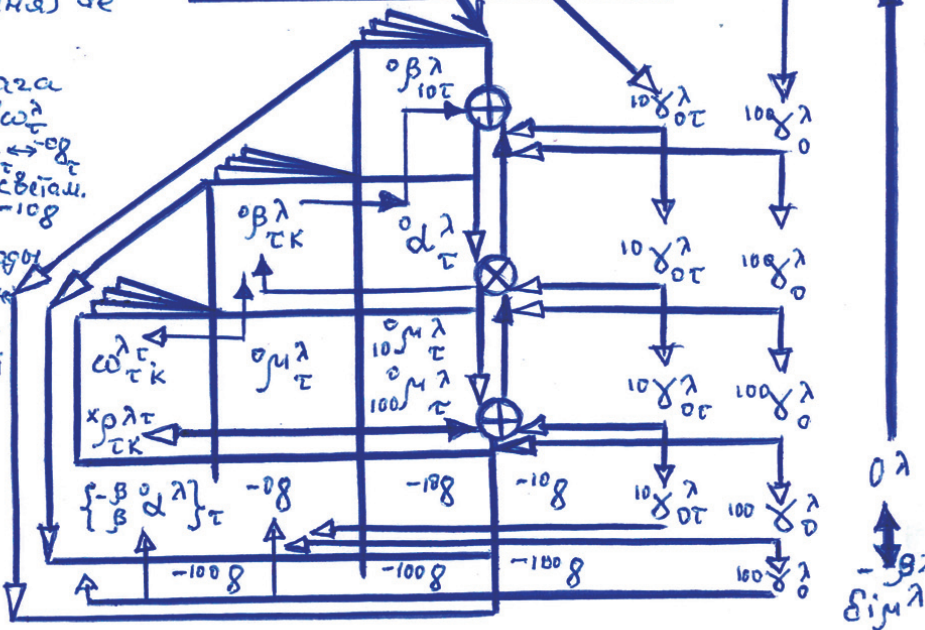
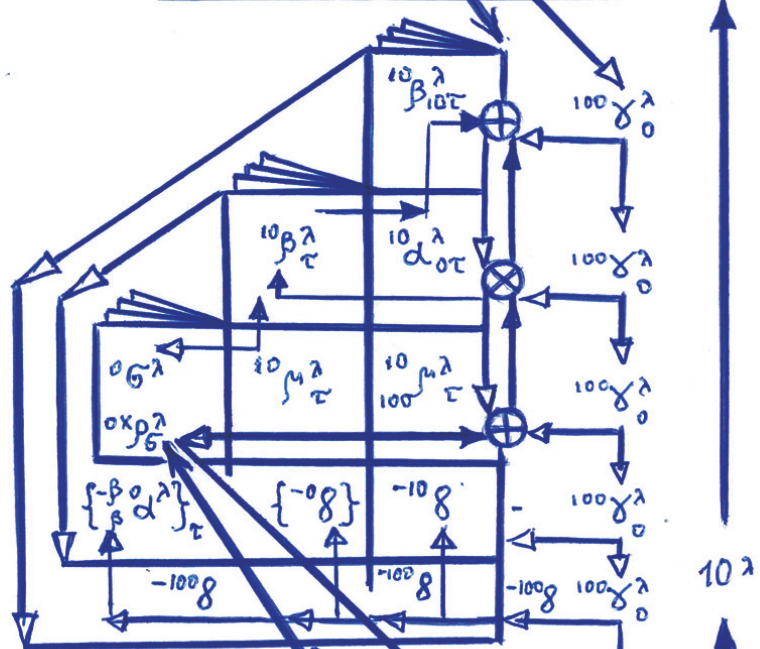
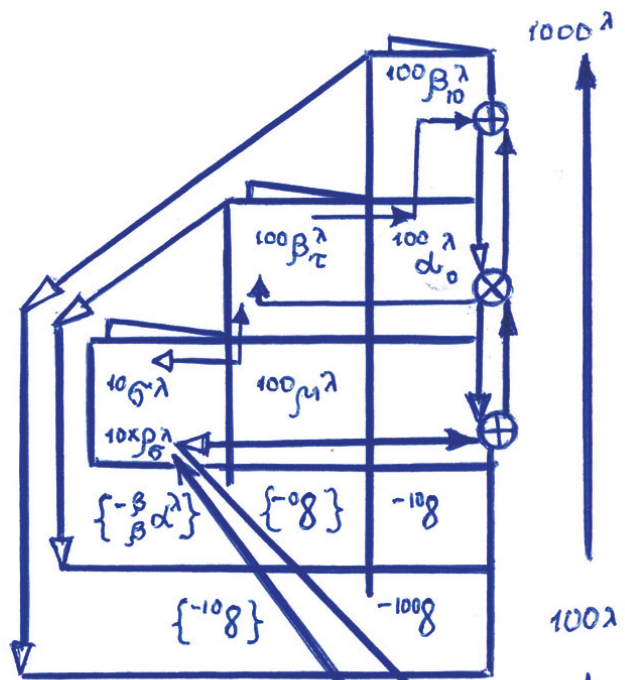


- $-0\lambda \leftrightarrow 0\lambda$  - памяць свету  $0\lambda$
- $-10\lambda \leftrightarrow 10\lambda$  - памяць свету  $10\lambda$
- $-100\lambda \leftrightarrow 100\lambda$  - памяць свету  $100\lambda$

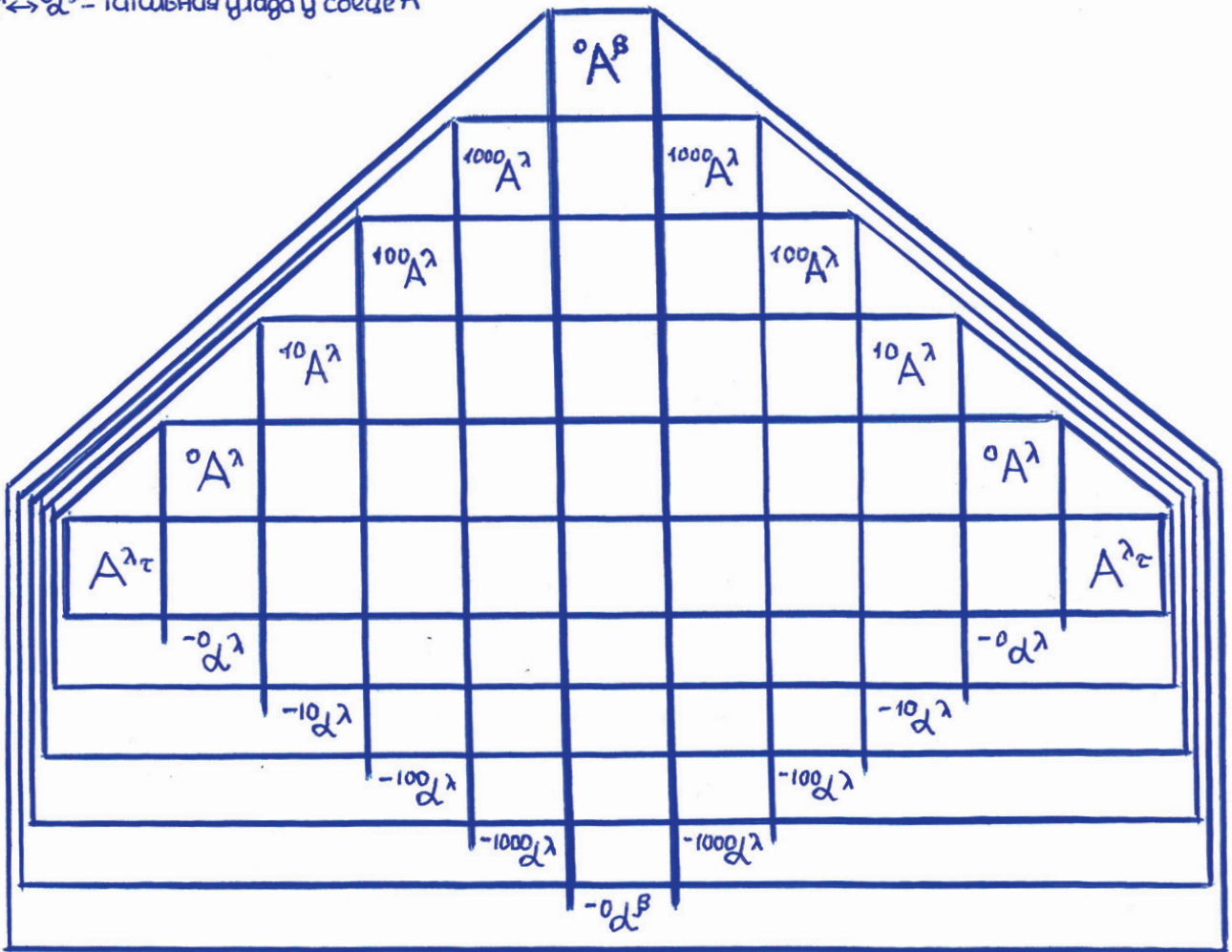
$10\lambda$  - множны лік (поле) тутаральнай узорнай ўлады - мех агон  $10\lambda$  асветнай тутаральнай ўлады  $100\tau\lambda \leftrightarrow 10\lambda$ . Сьстэмы  $\{10\tau\lambda\} \leftrightarrow \{\alpha^\lambda\}$  - вынікі множаньня крынічнай адзінкі  $10\tau\lambda$  з шчы хімерызны агон  $10\beta\lambda$  апінуўся гэ новы механізм агоні.  
 Сьстэмы  $\{10\tau\lambda\}$  сьвязваюць у іх мех агоні сьстэмы хімерызнай мернасьці  $0\lambda$ .

Улада поля  $10\lambda$  - адзінка  $100\tau\lambda$ ,  $100\tau\lambda$  агортвае поле  $10\lambda$  і ўнікае ў змешч адзінкі яго памяці  $-10\lambda$  рухам асветы (мавузэння) гэ мехазона.

$0\lambda$  - поле сьстэм хімерызнага чаду  $0\lambda \leftrightarrow \{\omega^\lambda\}$ . Адзінка  $0\omega^\lambda$  поля  $0\lambda$  мае паміць  $\{-\beta\alpha^\lambda\} \leftrightarrow 0\lambda$  гэ стакаў з навакальнымі сьветамі.  
 Улада памяці  $-0\lambda$  - сьвет  $-10\lambda$  тутаральнай асветнай ўлады  $10\lambda$  ў мехазон гэкі ўнікае адзінка  $0\lambda$ , гэты сьвет - узэр уладкаваньня памяці  $-0\lambda$  і мех агоні  $0\beta\lambda$  адзінкі  $0\lambda \leftrightarrow 10\tau\lambda$ .  
 Узэр  $-10\lambda$  мае сьветкі з адзінкамі памяці  $-0\lambda$ . Сьвет  $-100\lambda$  уладі  $100\tau\lambda$  агортвае ўсё поле  $0\lambda$  і ўнікае ў змешч адзінкі памяці  $-0\lambda$ .



$1000\alpha^\lambda \leftrightarrow \alpha^\beta$  - татальная ўлада ў свечце  $A^\lambda$



$$\begin{aligned}
 0 \times \rho^\lambda \rightarrow \sigma : \omega_0^\lambda \rightarrow \sigma^\lambda &\leftrightarrow \{ A_0^\lambda \rightarrow \{ A_\tau^\lambda \} \} \leftrightarrow \{ \updownarrow_0^\lambda \rightarrow \{ \updownarrow_\tau^\lambda \} \} \\
 0+ \rho^\lambda \rightarrow \omega : \sigma^\lambda \rightarrow \omega_0^\lambda &\leftrightarrow \{ \{ A_\tau^\lambda \} \rightarrow A_0^\lambda \} \leftrightarrow \{ \{ \updownarrow_\tau^\lambda \} \rightarrow \updownarrow_0^\lambda \} \\
 10 \times \rho^\lambda \rightarrow \sigma : \omega_0^\lambda \rightarrow \sigma^\lambda &\leftrightarrow \{ 10 A_0^\lambda \rightarrow \{ 10 A_\tau^\lambda \} \} \leftrightarrow \{ 10 \updownarrow_0^\lambda \rightarrow \{ 10 \updownarrow_\tau^\lambda \} \} \\
 10+ \rho^\lambda \rightarrow \omega : \sigma^\lambda \rightarrow \omega_0^\lambda &\leftrightarrow \{ \{ 10 A_\tau^\lambda \} \rightarrow 10 A_0^\lambda \} \leftrightarrow \{ \{ 10 \updownarrow_\tau^\lambda \} \rightarrow 10 \updownarrow_0^\lambda \} \\
 100 \times \rho^\lambda \rightarrow \sigma : \omega_0^\lambda \rightarrow \sigma^\lambda &\leftrightarrow \{ 100 A_0^\lambda \rightarrow \{ 100 A_\tau^\lambda \} \} \leftrightarrow \{ 100 \updownarrow_0^\lambda \rightarrow \{ 100 \updownarrow_\tau^\lambda \} \} \\
 100+ \rho^\lambda \rightarrow \omega : \sigma^\lambda \rightarrow \omega_0^\lambda &\leftrightarrow \{ \{ 100 A_\tau^\lambda \} \rightarrow 100 A_0^\lambda \} \leftrightarrow \{ \{ 100 \updownarrow_\tau^\lambda \} \rightarrow 100 \updownarrow_0^\lambda \} \\
 1000 \times \rho^\lambda \rightarrow \sigma : \omega_0^\lambda \rightarrow \sigma^\lambda &\leftrightarrow \{ 1000 A_0^\lambda \rightarrow \{ 1000 A_\tau^\lambda \} \} \leftrightarrow \{ 1000 \updownarrow_0^\lambda \rightarrow \{ 1000 \updownarrow_\tau^\lambda \} \} \\
 1000+ \rho^\lambda \rightarrow \omega : \sigma^\lambda \rightarrow \omega_0^\lambda &\leftrightarrow \{ \{ 1000 A_\tau^\lambda \} \rightarrow 1000 A_0^\lambda \} \leftrightarrow \{ \{ 1000 \updownarrow_\tau^\lambda \} \rightarrow 1000 \updownarrow_0^\lambda \} \\
 1000 \times \rho^\lambda \rightarrow \beta : \omega_0^\lambda \rightarrow \beta^\lambda &\leftrightarrow \{ 1000 A_0^\lambda \rightarrow \{ 1000 A_\tau^\lambda \} \} \leftrightarrow \{ 1000 \updownarrow_0^\lambda \rightarrow \{ 1000 \updownarrow_\tau^\lambda \} \} \\
 1000+ \rho^\lambda \rightarrow \beta : \omega_0^\lambda \rightarrow \beta^\lambda &\leftrightarrow \{ \{ 1000 A_\tau^\lambda \} \rightarrow 1000 A_0^\lambda \} \leftrightarrow \{ \{ 1000 \updownarrow_\tau^\lambda \} \rightarrow 1000 \updownarrow_0^\lambda \} \\
 1000 \times \rho^\lambda \rightarrow \beta : \omega_0^\lambda \rightarrow \beta^\lambda &\leftrightarrow \{ 1000 A_0^\lambda \rightarrow \{ 1000 A_\tau^\lambda \} \} \leftrightarrow \{ 1000 \updownarrow_0^\lambda \rightarrow \{ 1000 \updownarrow_\tau^\lambda \} \} \\
 1000+ \rho^\lambda \rightarrow \beta : \omega_0^\lambda \rightarrow \beta^\lambda &\leftrightarrow \{ \{ 1000 A_\tau^\lambda \} \rightarrow 1000 A_0^\lambda \} \leftrightarrow \{ \{ 1000 \updownarrow_\tau^\lambda \} \rightarrow 1000 \updownarrow_0^\lambda \}
 \end{aligned}$$

Рух  $\rho^\lambda \rightarrow \beta$  змены ўлады ў схеме  $\alpha^\lambda$  і сказе  $\alpha^\lambda$  уключае і рух у множным ліку  $\{ 1000 A^\lambda \} \leftrightarrow \beta^\lambda$  у пай сістэм татальнай ўлады  $1000 A^\lambda$ . Гэту магчымасць дае множны лік  $\{ \alpha^\lambda, \alpha^\lambda \}$  сімвалаў аэда  $A^\lambda$  і множны лік ортаў  $1000 \alpha, \lambda, \rho, \gamma, \omega, \Sigma, \beta$  атрыманы множаннем сімвалаў  $\{ \alpha^\lambda, \alpha^\lambda \}$  у іх змесце.

Згаданы рух выконваецца ў полі думкі (памыслі) - у палігонах навукі з тэтай разьлікаў новага свецца  $A^\beta$ . Рух у пай навукі абганце рухі ў паях практыкі, гэта поле прапануе сімвалы ўлады, а вынікі выканаўчых рухаў у практычных працэсах - загад новых рухаў навукі ў пай туману  $\beta^\lambda$  ці змены прапанаваных сімвалаў калі практыка апынаецца за іх межамі.



$\Lambda^\lambda, \lambda^\lambda$  - лік

Лік  $\Lambda^\lambda$  - пануєць сімвал свету  $A^\lambda$ ; сімвал-прапанова свету  $A^\beta$

Лік  $\Lambda^\lambda$  разом з рухам  $\rho^\lambda$  - основа математики  $A^\beta$ :  
 $\beta \Lambda^\lambda \leftrightarrow 1000 \Lambda^\lambda \leftrightarrow \Lambda^\beta \quad \beta \rho^\lambda \leftrightarrow 1000 \rho^\lambda \leftrightarrow \rho^\beta$

Лікі  $\Lambda^\lambda$  згодна законам  $\Gamma^\lambda$  абмену ієрархічных сістэм іх вынікамі (зместам палёў іх мэты і памяці) працуюць з усімі зонамі математики. Орты поля  $\beta \Lambda^\lambda, \beta^\lambda \leftrightarrow 1000 \lambda$   
 $\beta \Lambda^\lambda \leftrightarrow \{\beta A^\lambda, \beta \Lambda^\lambda, \beta \rho^\lambda, \beta \Gamma^\lambda, \beta \Omega^\lambda, \beta \Sigma^\lambda, \beta V^\lambda, \infty A^\beta\}$

аэда  $A^\lambda$  уключаюць лікі і аортваючыя імі, меўаца лікамі - асноўні ( $\lambda, \{\tau^\lambda, \mu^\lambda\}, 0, 1, 10$ ); туманнімі ( $\beta, \infty \leftrightarrow 8$ ). Лікавыя лікі - меркі месцаў сістэм у свеце, іх магутнасці і мэты

Механіка  $\rho^\lambda$  разам з рухам  $\rho^\lambda \rightarrow \beta$  змены свету  $A^\lambda$  (уключаюцца ў механічны агон (у змест) ієрархічных схем  $\alpha^\lambda \rightarrow \beta \leftrightarrow \{\alpha, \alpha\}^\lambda \rightarrow \beta$ ) уключае і рух  $\rho^\beta \rightarrow \infty$  змены схем  $\alpha^\lambda \rightarrow \beta$ . Шах  $\rho^\lambda \rightarrow \beta$  свету  $A^\lambda$  мае ў  $\rho^\lambda$  завадны лад, а лад шаху  $\rho^\beta \rightarrow \infty$  математики  $A^\beta$  - прапановны. Орт  $\rho^\lambda$  у працэсе  $\rho^\beta \rightarrow \infty$  множыць ключавую схему  $\alpha^\lambda \leftrightarrow \omega^\beta$  (адзінку нулявога кону математики  $A^\beta$ ) у свеце  $A^\lambda$  - у яе механічны агон (у гістарычных зместах ключавых ведаў);

множны лік (поле  $\beta^\beta \leftrightarrow \{\omega, \tau\}^\beta$  з туманным ладом  $\gamma^\beta$ ) тэхнічных рэчаў математики (схем аэда  $A^\lambda$ ) звязвае іх стыкамі (месцамі з'яўляю тэхнічных схем у куцы) - множыць схем на іх навакольных свет і прапануе орт  $\beta^\beta \leftrightarrow \gamma^\beta$  хімерызнай шавы поля  $\beta^\beta$  дзе абменьваюцца адметнасці схем (змены крынічных ведаў) і складаюцца вынікі абмену:  $\beta^\beta \leftrightarrow \alpha^\beta$ ; прапануе пануючыя схем (уладу  $\beta^\beta$  поля  $\beta^\beta$ ) - уздымае мернасць схем ведаў; сувязвае туманна лад іх крынічнага поля ў яго тутаральную ўзорную  $\alpha^\beta$ , тутаральную асветную  $1000 \alpha^\beta$  і татальную ўладу  $1000 \alpha^\beta \leftrightarrow \alpha^\infty$ ;

звязвае рух  $\beta^\beta \leftrightarrow \rho^\beta$  практыкі ў полі  $\beta^\beta A^\beta$  з рухам навукі  $\beta^\beta \leftrightarrow \rho^\beta$  - поля душкі  $\beta^\beta A^\beta \leftrightarrow \beta^\beta$ , поля новых сімвалаў свету.

Зваданы рух у орце  $\rho^\lambda \rightarrow \beta$  - схаваны: асноўная ўвага ў  $\rho^\lambda \rightarrow \beta$  на рух  $\rho^\lambda \rightarrow \beta$  змены свету  $A^\lambda$ . Рух  $\rho^\beta \rightarrow \infty$  у орце лікаў  $\Lambda^\lambda$  - асноўны.

Ключавы сімвал  $\alpha^\lambda \leftrightarrow \beta \leftrightarrow \{\alpha, \alpha\}^\lambda \leftrightarrow 1000 \alpha^\lambda \leftrightarrow \alpha^\beta$  аэда  $A^\lambda \leftrightarrow 1000 A^\lambda \leftrightarrow A^\beta$  - ієрархічны лік  $\alpha^\beta \leftrightarrow \lambda^0$   
 $\alpha^\beta \leftrightarrow \beta \text{ пан } \lambda^0 \leftrightarrow \beta \text{ пан } \beta^0 \leftrightarrow 1 \text{ вед } \beta^0 \leftrightarrow 1^\beta \leftrightarrow 1^0 \leftrightarrow \lambda^0$ .

Рухам  $\rho^\lambda \rightarrow \beta \rightarrow \infty$  у метах адзінкі  $1^0$  звязаныя:  
механічны агон - свет  $A^\lambda \leftrightarrow 1 \leftrightarrow \{\omega, \tau\}^\lambda \leftrightarrow \beta^\lambda \leftrightarrow \{\lambda, \tau\}^\lambda, \beta^\lambda \rightarrow 0$ , памяць  $8^{-1}$  адзінкі  $1^0$ ;  
улада - адзінкавы лік, нулявы кон математики  $A^\beta \leftrightarrow \Lambda^\beta \leftrightarrow 1^0$ ;  
хімерызны агон - туман  $V^\beta \leftrightarrow 8^1$ , поле  $\Sigma^\beta$ , рух  $\rho^\beta$  з законам  $\Gamma^\beta$  ієрархічных лікаў  $\Lambda^\beta \leftrightarrow \{\lambda, \tau\}^\beta$   
 $\{\lambda, \tau\}^\beta \leftrightarrow \{\omega, \tau\}^\beta \leftrightarrow \{\beta, 1\}^\beta$  (адзінак кону  $\Omega^\beta$ ) у полі цяжы  $\rho^\beta \rightarrow \infty$  метаўлады  $A^\infty, \infty \rightarrow 1$ .

Шах математики  $\rho^0 \rightarrow 1$  (шах кону лікаў  $\Lambda^0 \rightarrow 1$ ) множыць ключавую схему ведаў  $1 \text{ вед } \beta^0 \leftrightarrow 1^0$  і ў полі лікаў  $\beta^\beta \leftrightarrow \beta^0 \leftrightarrow \beta^0 \leftrightarrow 1^0$  узнікаюць стікі  $\beta^\beta \leftrightarrow \beta^0$  лікаў  $\{\beta^0\}$ , орты ўлады  $\beta^\beta$  і метаўлады  $\Lambda^1$ . Рэй уздымаў мернасці вядзе пан-лік  $\Lambda^0$ .

Лік-лік  $\Lambda^0$  - адзінка свету  $A^\beta \rightarrow \Lambda^0 \rightarrow 1$  якая прапануе ўсе сістэмы ўлады ў  $A^\beta$  хімерызную  $\Lambda^\beta$ , тутаральную ўзорную  $1000 \Lambda^0$ , тутаральную асветную  $1000 \Lambda^0$ ; татальную  $1000 \Lambda^0 \leftrightarrow \Lambda^1$ . Разам з ёй прапануе меранізі  $\rho^0 \rightarrow 1$  аднаўлення лічбага свету  $A^\lambda \leftrightarrow A^\beta \leftrightarrow \Lambda^1$ , змены пануючага свету  $A^\beta \leftrightarrow \Lambda^0$  і прапановы (разліку) новага свету  $A^\infty \leftrightarrow \Lambda^1$ .

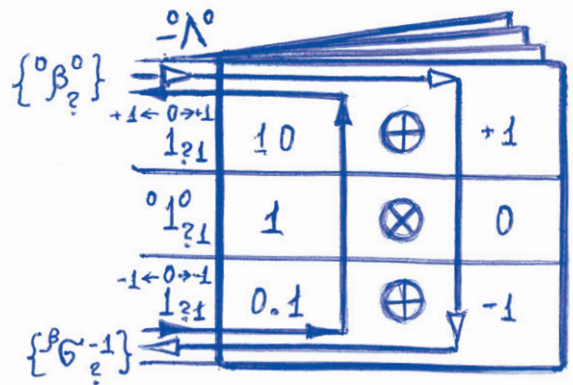
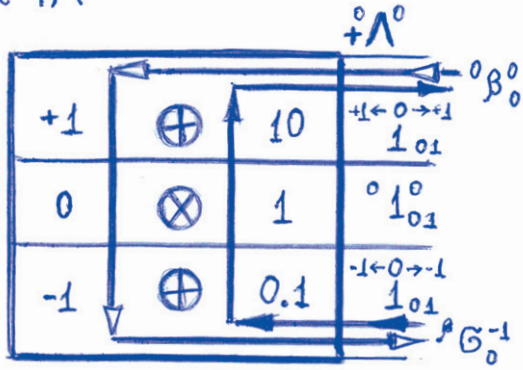
Лік-лік  $\Lambda^0$  у міг  $\tau^0 \rightarrow 0$  ч акце  
 $\rho^\beta \rightarrow \omega: \{\beta^\beta \leftrightarrow \beta^0 \leftrightarrow 1^0 \leftrightarrow 1\} \rightarrow \{\beta^\beta \leftrightarrow \beta^0 \leftrightarrow \omega^\beta\} \leftrightarrow \{\lambda^\beta\} \leftrightarrow \{\beta^0\} \leftrightarrow \{\Lambda^0\}$   
- тэхнічна адзінка  $\beta^\beta \leftrightarrow 1^0$  поля  $\beta^\beta \leftrightarrow \{\beta^0\}$ . Лік  $\beta^\beta$  у гэты міг мае туманна лад  $\beta^\beta \leftrightarrow \beta^0$ , а тэхнічны лікі  $\{\beta^0\}$  - туманна нумары  $\{\beta^0\} \leftrightarrow \{\beta^0\}$  якія з цягам часу мусяць асноць  $\{\beta^0\} \leftrightarrow \{0, 1, \dots, 10\}^\beta$  ( $10^\beta$  - магнітвая поля  $\beta^0$ ). У міг  $\tau^0 \rightarrow 0$  усе адзінкі могуць лічыць нумар  $1^0 \leftrightarrow 0^0$  (нумар іх крыніцы) уласным. Гэты нумар у канцы працэса захаввае адзінка ў метах якой узнікаюць усе конь ўлады. Тутаральнае ўлада, як і хімерызная, мота ўзнікаць у метах многіх лікаў, але татальнае - у адным - у пануючым ліку, які апінаецца пан-лікам у міг прапановы татальнай ўлады, а раней - хавалася ў меншым ліку тэхнічных сістэм і тутаральных адзінак.

Лік-лік  $\Lambda^\lambda \rightarrow \beta \rightarrow \infty$  з рухам  $\rho^\lambda \rightarrow \beta \rightarrow \infty$  - механізм (лічбавы, працэсар, вагі, адзінкі) стікі рух адганяе ўсе рухі вядомага (лічбага) свету  $A^\lambda$ . Мера руху лікаў  
 $1 \text{ ан } \beta / \text{мі } \beta \leftrightarrow 1 \text{ мен } \beta$ .

$1 \text{ мен } \beta$  - мерка рухаў памяці аэда  $A^\lambda$ , якая апінаецца пануючай сістэмай у лічбавы свеце  $A^\lambda$  кабі ў яе метах узнікае і працуе сімвал  $A^\beta$ . Фактычна аб'ект ведаў іх рухаў свету  $A^\lambda$ , працэсар (адзінкі)  $A^\beta \leftrightarrow \beta^\beta$  дае магільнасць разлічваць вынікі гэтых рухаў, змяняць іх загадач, прапануюць новыя мэты і магільнасці лічбавы свету.

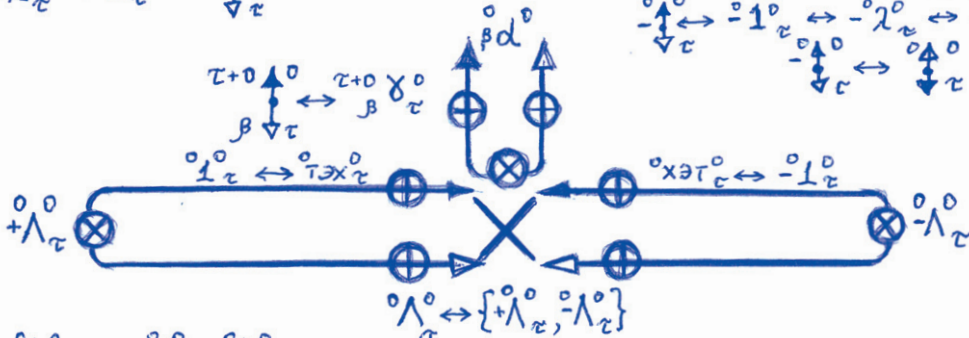


$d^{\lambda} | \Lambda^0$



${}^{\circ}\lambda_{\sigma\tau} \leftrightarrow {}^{\circ}1_{\sigma\tau} \leftrightarrow {}^{\circ}\tau\chi_{\sigma\tau}$   
 $\tau \leftrightarrow \{0, 1, \dots, \infty \rightarrow 10\}^{\circ}$   
 Гон  ${}^{\circ}\Lambda^0$  - власны гон пан-ліка  $\Lambda^0$   
 ${}^{\circ}\lambda_{\sigma\sigma} \leftrightarrow \lambda_{\tau} \leftrightarrow 1_{\tau} \leftrightarrow \downarrow_{\tau}$

${}^{\circ}\chi\tau\sigma_{\sigma\tau} \leftrightarrow -1_{\tau} \leftrightarrow -\lambda_{\sigma\tau}^{\circ} \leftrightarrow$   
 $\leftrightarrow \beta_{\tau}^{\circ} \leftrightarrow \{\omega_{\tau\tau}^{\circ}\} \leftrightarrow \{\lambda_{\tau\tau}^{\circ}\} \leftrightarrow \{1_{\tau\tau}^{\circ}\}$   
 поле зонаў  $-\Lambda^0 \leftrightarrow \beta_{\tau}^{\circ}$  - наваколны  
 свет зона  ${}^{\circ}\Lambda^0$  пан-ліка  $\Lambda^0$   
 ${}^{\circ}\lambda_{\tau} \leftrightarrow -1_{\tau} \leftrightarrow -\lambda_{\tau}^{\circ} \leftrightarrow -\lambda_{\sigma\tau}^{\circ}$   
 ${}^{\circ}\lambda_{\tau} \leftrightarrow \downarrow_{\tau}$



$[+\downarrow_{\tau} \otimes -\downarrow_{\tau}] \leftrightarrow [+\downarrow_{\tau} \otimes \downarrow_{\tau}] \leftrightarrow [+\lambda_{\tau} \otimes -\lambda_{\tau}] \leftrightarrow [1_{\tau} \otimes -1_{\tau}] \leftrightarrow \tau_{\beta}^{\circ} \leftrightarrow \tau_{\beta}^{\circ} \leftrightarrow \tau_{\beta}^{\circ} \leftrightarrow \beta^{\circ}$

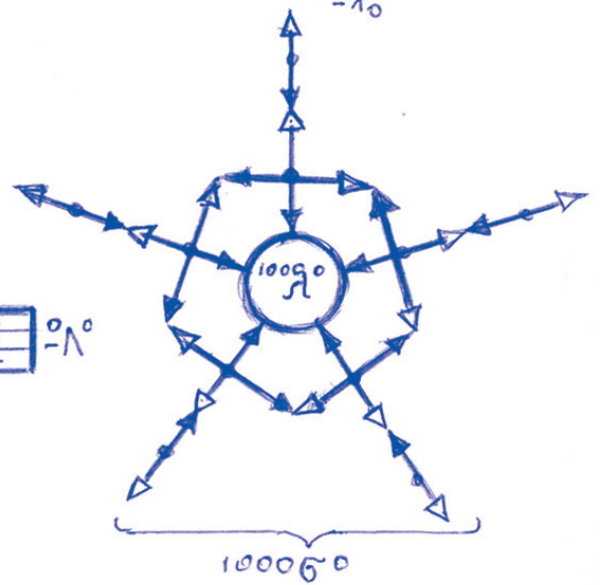
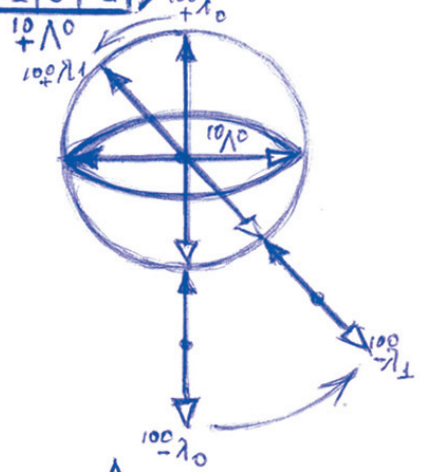
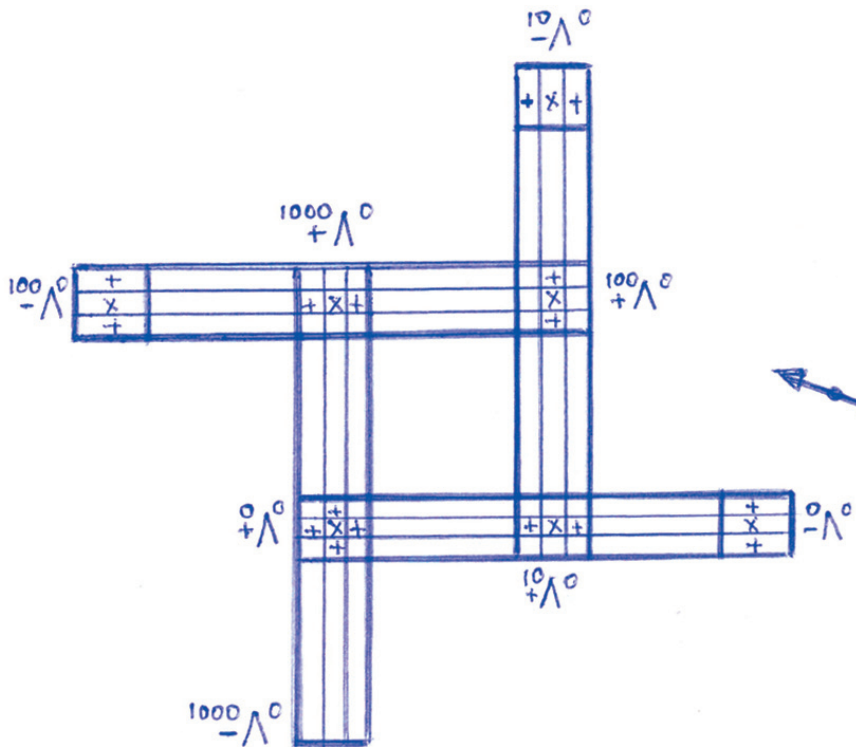
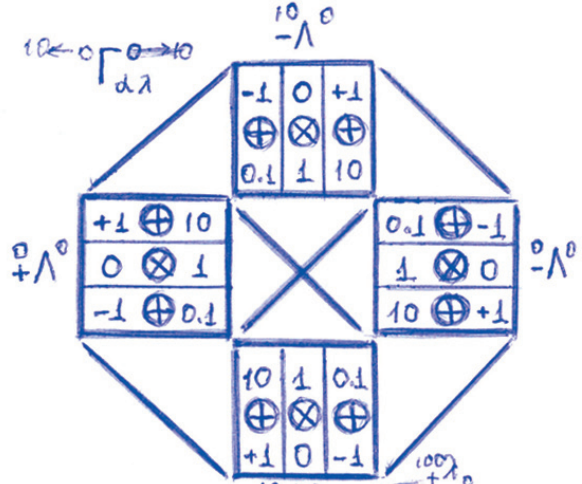
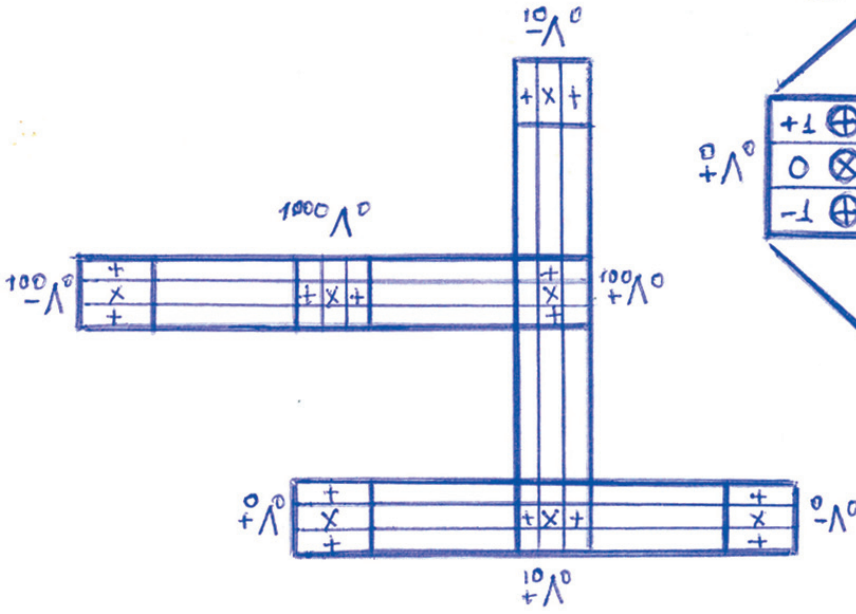
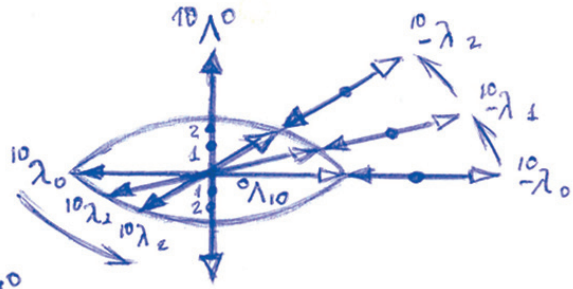
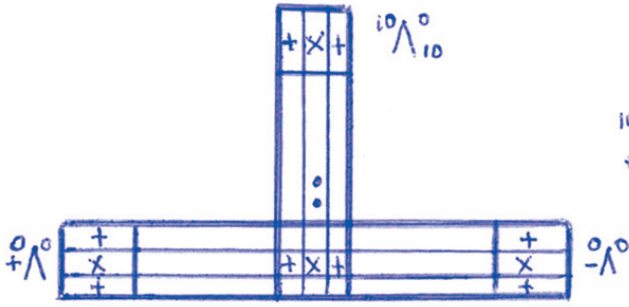
$\tau_{\beta}^{\circ}$  - стык (вузел) лікаў  $\lambda_{\tau}^{\circ}$  і  $\lambda_{\tau}^{\circ}$  іх хімерызмаў агоніі ў ліч  $\tau^{\circ}$   
 $\tau_{\beta}^{\circ}$  - орт складання вузлаў  $\tau_{\beta}^{\circ}$  - сімвал орта  $\tau_{\beta}^{\circ}$  у памяці  $\beta^{\circ}$   
 $\beta^{\circ}$  - хімерызная ўлада поля  $\Lambda^0 \leftrightarrow \{+\Lambda^0, -\Lambda^0\}$ ,  $\lambda_{\tau}^{\circ}$  - прапанова тутаральнай  
 ўзорнай ўлады ў памяці  $\beta^{\circ}$

тутаральная ўзорная ўлада  $\leftrightarrow$  тут  $\leftrightarrow$   ${}^{\circ}\Lambda^0 \leftrightarrow \{{}^{\circ}\lambda_{\tau}^{\circ}\} \leftrightarrow \{1_{\tau}^{\circ}\} \leftrightarrow \{\downarrow_{\tau}^{\circ}\}$   
 поля  $\Lambda^0$

$+1 \oplus 10$	$+1 \leftarrow \beta_{\tau}^{\circ} \rightarrow +1$	10	1	0.1	$\beta_{\tau}^{\circ} \leftrightarrow \beta_{\tau}^{\circ} \leftrightarrow \beta_{\tau}^{\circ}$	$\beta_{\tau}^{\circ} \leftrightarrow \beta_{\tau}^{\circ} \leftrightarrow -\beta_{\tau}^{\circ} \leftrightarrow -\lambda_{\tau}^{\circ}$
$0 \otimes 1$	$1 \ 2 \ \dots \ \beta_{\tau}^{\circ} \rightarrow \beta_{\tau}^{\circ}$	$\oplus$	$\otimes$	$\oplus$	$10-1$	$-(10-1) \dots -\lambda_{\tau} \dots -2-1$
$-1 \oplus 0.1$	$-1 \leftarrow \beta_{\tau}^{\circ} \rightarrow -1$	$+1$	$0$	$-1$		$0.1 \oplus -1$

$\lambda({}^{\circ}\lambda_{\tau}^{\circ}) \leftrightarrow \beta_{\tau}^{\circ} \lambda_{\tau}^{\circ} \leftrightarrow \infty, \infty, \{+1, 0, -1\}, \{+1, 0, -1\} \leftrightarrow \beta_{\tau}^{\circ} \beta_{\tau}^{\circ} \leftrightarrow 10\beta_{\tau}^{\circ}$   
 $\beta_{\tau}^{\circ} \leftrightarrow [+\downarrow_{\tau} \otimes -\downarrow_{\tau}] \leftrightarrow [\downarrow_{\tau} \otimes \downarrow_{\tau}] \leftrightarrow [1_{\tau} \otimes -1_{\tau}] \leftrightarrow [+\lambda_{\tau} \otimes -\lambda_{\tau}]$   
 $\text{mat } \lambda_{\tau}^{\circ} \leftrightarrow \text{mat } {}^{\circ}\lambda_{\tau}^{\circ} \leftrightarrow \{10, 1, 0.1\}^{\circ} \leftrightarrow 1_{\tau}^{\circ}$   $\text{mat } (-{}^{\circ}\lambda_{\tau}^{\circ}) \leftrightarrow -\text{mat } \lambda_{\tau}^{\circ}$   
 $\text{mat } {}^{\circ}\lambda_{\tau}^{\circ} \leftrightarrow {}^{\circ}\beta_{\tau}^{\circ} \leftrightarrow {}^{\circ}\beta_{\tau}^{\circ} \leftrightarrow 1^{\circ} \text{mat }^{\circ}$   
 ${}^{\circ}\Lambda_{10}$  - памяць ліка  ${}^{\circ}\Lambda^0$ , мэта ліка  ${}^{\circ}\Lambda^0$  - лік  ${}^{\circ}\Lambda^0$ , меткі лікаў у  ${}^{\circ}\Lambda^0$  -  $\tau^{\circ}$ ,  $\lambda_{\tau}^{\circ}$   
 ${}^{\circ}\Lambda_{10}$  - механізм агоніі ліка  ${}^{\circ}\Lambda^0$   
 ${}^{\circ}10$  - аснова поля  ${}^{\circ}\Lambda^0$   
 ${}^{\circ}10$   $\leftrightarrow \{0, 1, \dots, 10\}^{\circ}$  - аснова поля  $\Lambda$

$d^2 \Lambda^0$



$\Lambda^1 \rightarrow \{\lambda_0^1, \dots, \lambda_0^1, \dots, \lambda_0^1\} \leftrightarrow \sigma^1$



$\alpha^\lambda | \Lambda^0$

$\beta^\tau, \beta^\mu, \beta^\lambda$  - лікавыя меркі ў зонах  $\beta^\lambda$ ,  $\lambda \in \{-1, 0, +1\}$

Нумары  $\beta^\tau \leftrightarrow \beta^\mu$  і магнітуды  $\beta^\mu \leftrightarrow \beta^\lambda$  лікаў  $\beta^\lambda$  у зонах  $\Lambda$  - натуральныя лікі: яны ўключаюць іх натуральную гісторыю (мінусы рух сугнутаў і рэз) як адзінку - нулявы кон. Нулявая адзінка  $\beta^\lambda \leftrightarrow \beta^1$  лікаў  $\beta^\lambda$  пакуючага зона  $\beta^\lambda$  - іх аснова, мерная адзінка зона,  $\beta^\mu$  (адзінка змены),  $\beta^\mu$  - крынічная ўлада  $\beta^\lambda$  і мэтай кону мінусым зоне, яшчэ можа  $\beta^\lambda$ . Лік  $\beta^\lambda$  зона  $\beta^\lambda$  за адзін з'явіцца ад нулявога стану на  $\beta^\mu \leftrightarrow \beta^\lambda$  - на магнітуду нулявой адзінкі (знак  $\beta^\lambda$  у сімвале  $\beta^\mu$  - метка якая ўлічвае колькасць шахаў у зоне  $\beta^\lambda$  на міз  $\beta^\lambda$  - колькасць уздымаў нулявога кону ў руху змены зона  $\beta^\lambda$ ).

$$\beta^\mu \leftrightarrow \beta^\tau \leftrightarrow \beta \{0, 1, \dots, \infty \rightarrow 10\}^\lambda \leftrightarrow$$

$$\leftrightarrow \beta \{\tau_0 \leftrightarrow 0 \leftrightarrow 1_0, \tau_1 \leftrightarrow 1_0 \oplus 1_{0,1} \leftrightarrow 1_1, \dots, \tau_2 \leftrightarrow \tau_{2-1} \oplus 1_{0,2} \leftrightarrow 1_2, \dots, \tau_{10} \leftrightarrow \tau_{10-1} \oplus 1_{0,10} \leftrightarrow 1_{10} \leftrightarrow 10\}^\lambda$$

$$\beta^\mu \leftrightarrow \beta^\lambda \leftrightarrow \beta \{\mu_0, \mu_1 \leftrightarrow \mu_0 \oplus \mu_{0,1} \leftrightarrow 1_{0,1}, \dots, \mu_2 \leftrightarrow \mu_{2-1} \oplus \mu_{0,2} \leftrightarrow \tau \otimes \mu_0, \dots, \mu_{10} \leftrightarrow \mu_{10-1} \oplus \mu_{10,0} \leftrightarrow 10 \otimes \mu_0\}^\lambda$$

$$\beta^\mu \leftrightarrow \beta^\lambda \leftrightarrow \beta \left| \begin{matrix} 10 \\ 1 \\ 0.1 \end{matrix} \right|_0^\lambda \leftrightarrow \beta 1_0^\lambda$$

$$\beta^\mu \leftrightarrow \beta^\lambda \leftrightarrow \beta \left| \begin{matrix} 10 \\ 1 \\ 0.1 \end{matrix} \right|_0^\lambda \oplus \beta \left| \begin{matrix} 10 \\ 1 \\ 0.1 \end{matrix} \right|_{0,1}^\lambda \oplus \dots \oplus \beta \left| \begin{matrix} 10 \\ 1 \\ 0.1 \end{matrix} \right|_{0,10}^\lambda \leftrightarrow$$

$$\leftrightarrow \left| \begin{matrix} \beta \{10_0 \oplus 10_{0,1} \oplus \dots \oplus 10_{0,10}\}^\lambda \\ \beta \{1_0 \oplus 1_{0,1} \oplus \dots \oplus 1_{0,10}\}^\lambda \\ \beta \{0.1_0 \oplus 0.1_{0,1} \oplus \dots \oplus 0.1_{0,10}\}^\lambda \end{matrix} \right| \leftrightarrow \left| \begin{matrix} \beta 100^\lambda \\ \beta 10^\lambda \\ \beta 1^\lambda \end{matrix} \right| \leftrightarrow$$

$$\leftrightarrow \beta \left\{ 10 \otimes \left| \begin{matrix} 10 \\ 1 \\ 0.1 \end{matrix} \right|_0 \right\}^\lambda \leftrightarrow \beta 10_0^\lambda \leftrightarrow \beta 1_0^\lambda$$

$\beta^\lambda \leftrightarrow \delta \beta^\mu$  - мернасць лікаў, адзінкі мернасці лікаў - месцы іх актаў руху:

$$0 \delta \beta^\mu \leftrightarrow \delta \beta^\mu \Lambda_0^0 \leftrightarrow \beta \left| \begin{matrix} +1 \\ 0 \\ -1 \end{matrix} \right|_0^0$$

$$\delta \beta^\mu \Lambda_{10}^0 \leftrightarrow \beta \left\{ \left| \begin{matrix} +1 \\ 0 \\ -1 \end{matrix} \right|_0^0 \oplus \left| \begin{matrix} +1 \\ 0 \\ -1 \end{matrix} \right|_{0,1}^0 \oplus \dots \oplus \left| \begin{matrix} +1 \\ 0 \\ -1 \end{matrix} \right|_{0,10}^0 \right\} \leftrightarrow \beta \left\{ 10^0 \otimes \left| \begin{matrix} +1 \\ 0 \\ -1 \end{matrix} \right|_0^0 \right\} \leftrightarrow$$

$$\leftrightarrow 10 \delta \beta^\mu \Lambda_0^0 \leftrightarrow 10 \delta \beta^\mu \leftrightarrow 0 \delta \beta^\mu \Lambda_0^0$$

$$1000 \delta \beta^\mu \leftrightarrow 10^0 \otimes \left\{ 10^0 \otimes \left\{ 10^0 \otimes \left| \begin{matrix} +1 \\ 0 \\ -1 \end{matrix} \right|_0^0 \right\} \right\}$$

$$\underbrace{1 + 1 + 1}_3$$

3 - мернасць поцякудзінных лікаў

1000  $\delta \beta^\mu$  - кубічны лік уключае 3 акты множання мернасці нулявой адзінкі на  $\beta 10^0$  сімвал кубічнай мернасці ўключае 3 нулі: 1000  $\delta \beta^\mu$

100  $\delta \beta^\mu$  - сотка, поле 2-мерных лікаў, 10-ты кон 2-мерных лікаў і нулявы кон кубічных лікаў

10  $\delta \beta^\mu$  - вузгал у мэтах соткі, 10-ты кон аднамерных лікаў і нулявы кон вузгалоў (2-мерных лікаў)

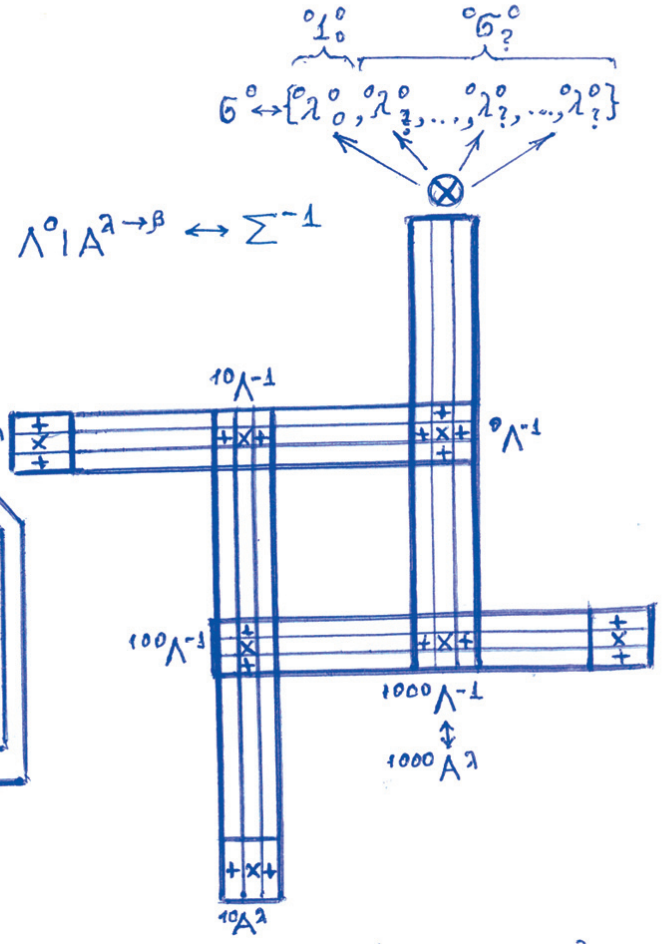
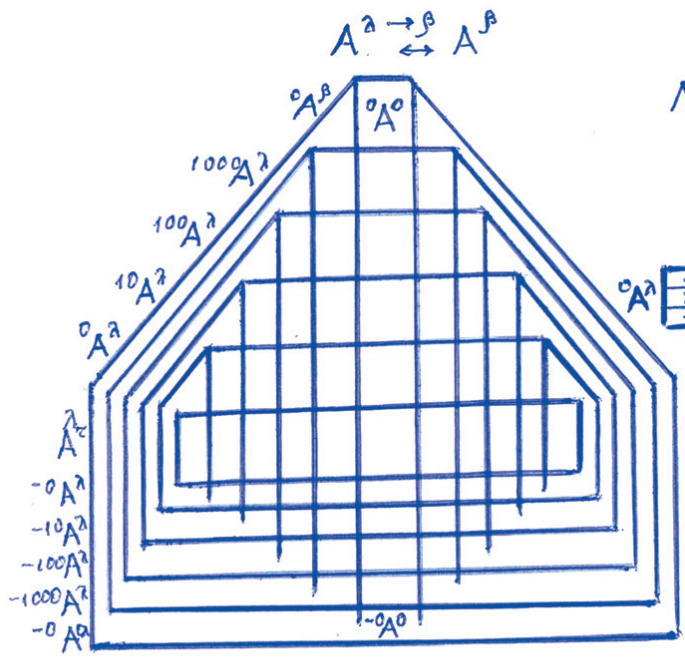
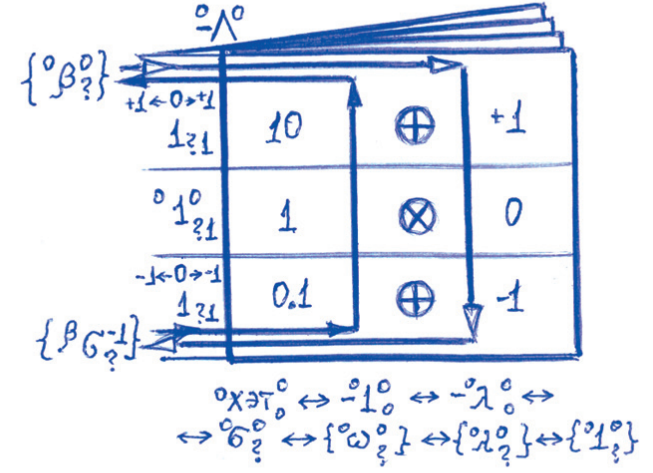
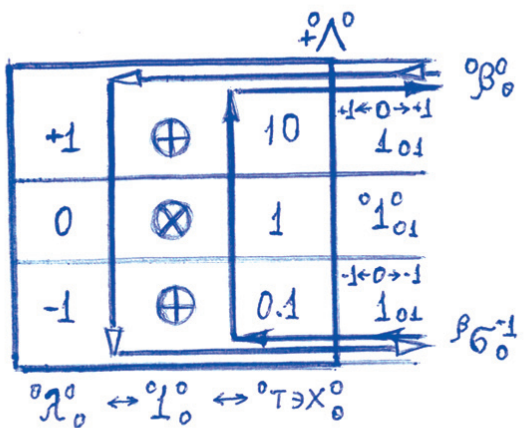
0  $\delta \beta^\mu$  - нульмерны лік, адзінка;  $\tau \delta \beta^\mu$ ,  $\tau \rightarrow 10^0$  - лінейны лік, ланцуг (зарга, зарада) 0-мерных лікаў.

Калі пан-лік  $\Lambda^0$  рухам асветы  $\beta^\mu \rightarrow \beta$  унікае ў змешчаны сістэм (у змешчаны свету  $\Lambda^\lambda$  ці  $\Lambda^\tau$ ), асновы  $\beta 10^\lambda$  ортаў  $\beta \Lambda^0$  пан-лікаў  $\Lambda^0$  узгадняюцца з гістарычнымі асновамі - натуральнай меркай сістэм з  $\Lambda^\lambda$  ці  $\Lambda^\tau$ . Заданная мерка можа аказацца надта вялікай і (з мэтай сціскавання сімвалаў) у мэтах ортаў  $\beta \Lambda^0$  магчыма ўздымаць адвольных асноў  $\beta 10^\lambda$ . Такія асновы дазваляюць карыстацца запісамі

$$\beta \cdot 10^k$$

дзе  $k$  - ступень асновы  $10$ ;  $k, \delta$  - лічбы ў мэтах адвольнай асновы  $10$ . Ступень  $k$  адвольнай асновы, у адзінку ад  $\beta^\lambda \leftrightarrow \delta \beta^\mu$ ,  $\lambda \in \{-1, 0, +1\}$ , не ўздымае мернасць лікаў.

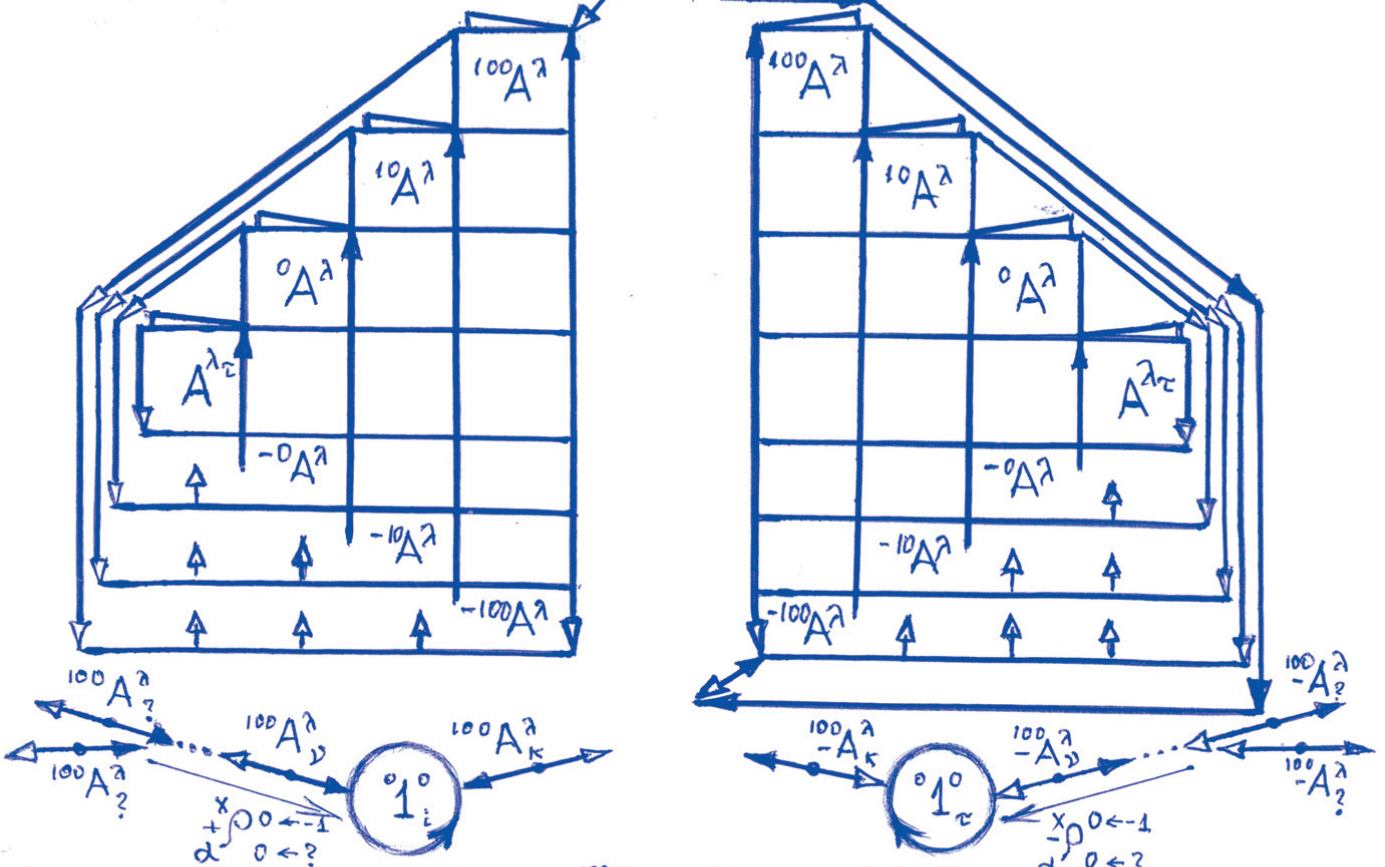
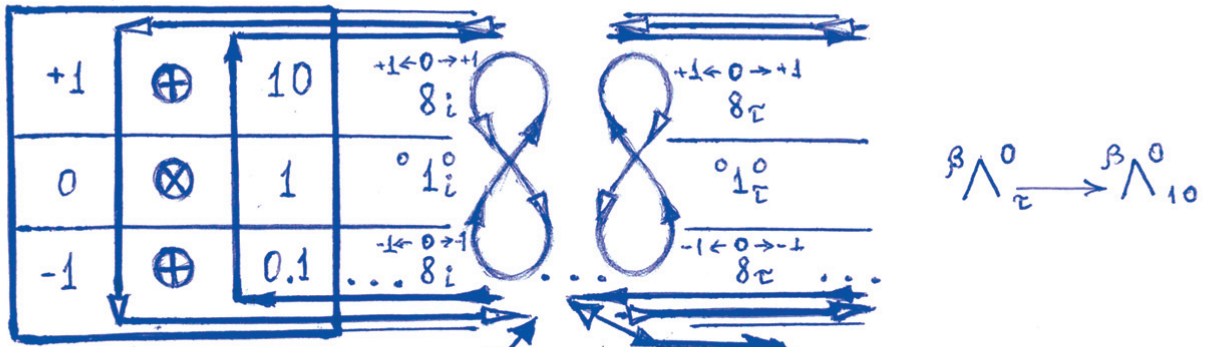
$\rho^{-1 \rightarrow 0} : \{A^\lambda \leftrightarrow A^{-1} \leftrightarrow \Lambda^{-1}\} \longrightarrow \{A^\beta \leftrightarrow A^0 \leftrightarrow \Lambda^0\}$  - натуральна історія лікаў,  
 $\Lambda^{-1}$  - механічны агон лікаў поля  ${}^0\Lambda^0$ ,  $\Lambda^{-1} \leftrightarrow \Sigma^{-1}$



$\{\rho^{\lambda \rightarrow \beta} : A^\lambda \rightarrow A^\beta\} \longleftrightarrow \{\rho^{-1 \rightarrow 0} : \Lambda^{-1} \rightarrow \Lambda^0\}$

Схема  $\Lambda^0 | A^{\lambda \rightarrow \beta}$  - натуральна історыя  $\rho^{\lambda \rightarrow \beta}$  матэматыкі  $A^\beta \leftrightarrow \Lambda^0$ ; яе механічны агон  $\Lambda^{-1}$  (свет  $A^\lambda$ ) у сімвалах пан-ліка  $\Lambda^0$ . Ган-лік, у адрозненне ад лічбавых адзінак чыслы, працуе ў адвольных месцах  $A^\lambda$ .  
 Схема  $\Lambda^0 | A^{\lambda \rightarrow \beta}$  - вынік руху свету - руху множання  $\rho^{\omega \rightarrow \beta}$  ліка  $\Lambda^0$  на месце  $\beta^{-1}$  зно нулявой адзінкі (на свет  $A^\lambda \leftrightarrow \Lambda^{-1}$ ). У згаданым руху сімвалам свету  $A^\lambda$  апынаецца лікавы працэсар  $\Lambda^{-1}$ . Гэта дае магчымасць разбіваць змены свету  $A^\lambda$  у месцах механікі  $\rho^\beta$  лікаў  $\Lambda^0$ .  
 Рухам свету  $\Lambda^0 | A^{\lambda \rightarrow \beta}$  з  $\Lambda^0$  у лічбы свет  $A^\lambda$  атрымліваецца працэсар  $\Lambda^{-2}$  з усімі зеркамі працэсара  $\Lambda^0$ . Гэта дае магчымасць разбіваць змены свету  $A^\lambda$  - механічных агон лікаў сістэмы свету  $A^\lambda$ .

$\{\beta\rho_i^0 \leftrightarrow \beta\uparrow_i^0, -\beta\rho_\tau^0 \leftrightarrow \beta\uparrow_\tau^0\} \leftarrow$  змена механізма руху ў зонах  $\beta\Lambda^0$  ліка  $\Lambda^0$



Натуральны рух  $\beta\rho_i^0 \leftrightarrow \beta\uparrow_i^0$  ліка  $1_i^0$  у полі  $100A^\lambda$

Рэхава рух  $\beta\rho_\tau^0 \leftrightarrow \beta\uparrow_\tau^0$  ліка  $1_\tau^0$  у полі ведаў  $100A^\lambda$

Натуральны рух  $\beta\uparrow_i^0$  выконваецца стыкам пан-ліка  $\Lambda^0$  з полем тумана-практыкі яго механічнага агона (у прапанаванай узорнай схеме – з полем  $100A^\lambda$  мернасьці ведаў  $100A^\lambda$  свецу  $A^\lambda$ ); светлы канец стрэжкі маха ліка  $1_i^0$  стыкуецца з цёмнымі канцамі стрэжак махаў яго мехэгона і лік мае натуральны мат (натуральнае гарэванне актаў у яго механізме руху).

Рэхава рух  $\beta\uparrow_\tau^0$  выконваецца стыкам цёмнага канца стрэжкі маха ліка і светлых канцоў махаў месцігаў яго мехэгона: рэхава асвета – азэрэнне туману-памыці ў адзінках мехэгона. Мат рэхавага руху працуе як рэха натуральнага мата:

$$\text{мат } 1_i^0 \leftrightarrow \beta\rho_i^0 \leftrightarrow \beta\uparrow_i^0 \leftrightarrow -\beta\rho_i^0 \leftrightarrow -\text{мат } 1_i^0, \text{ мат } 1_\tau^0 \leftrightarrow \beta\rho_\tau^0 \leftrightarrow \beta\uparrow_\tau^0 \leftrightarrow -\beta\rho_\tau^0 \leftrightarrow -\text{мат } 1_\tau^0$$

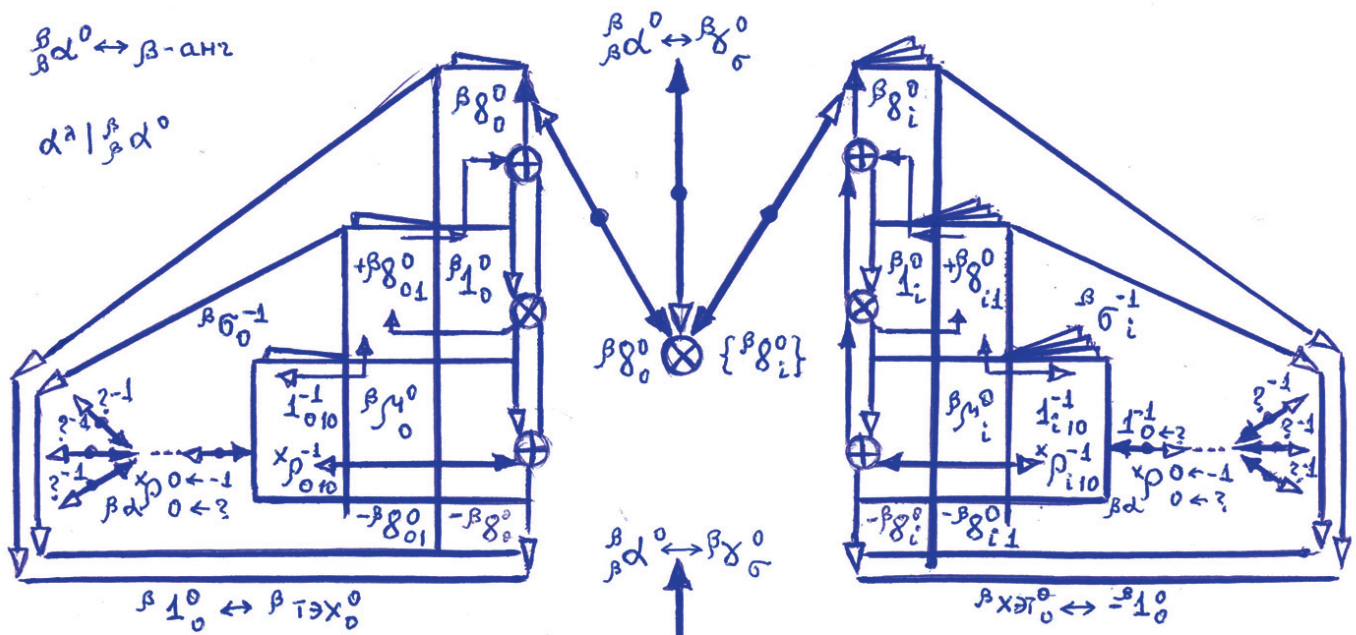
Гоня  $\beta\Lambda^0$  ліка  $\Lambda^0$  моцць гарэваць механізм руху ў іх межох у працэсе  $\beta\rho^0 \rightarrow \Lambda^0 \rightarrow \Lambda^1$ . Змена натуральнага агона на рэхава (рэхавага на натуральна) у працэсе  $\beta\rho^0 \rightarrow 1$  змяняе гоня руху навузэння  $\beta\rho^0 \leftarrow -1$ ;  $\beta\rho^0 \leftarrow -1$  ў навакальным свеце механічнага агонаў адзін на аднаго. У натуральным руху працэсе навузэння ў сіэтэмах мехэгона выконваецца з поля практыкі іх хімерызных агонаў, а ў рэхаваці руху навузэння (і ўздым мернасьці) выконваецца з поля памыці.



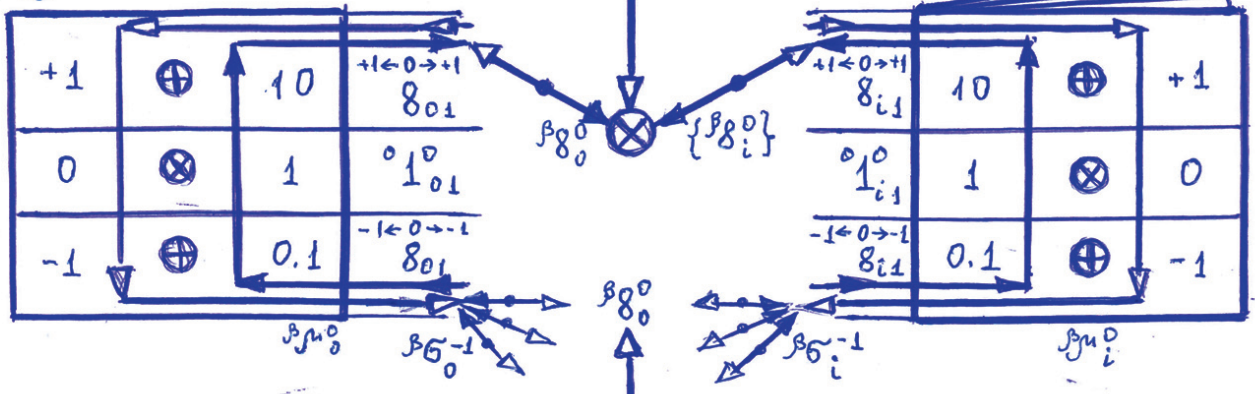
$\Lambda^0 | \beta^0$  - механіка туману (хіміризнага агону)  $\beta^0$  у свеце лікаў  $\Lambda^0$ ,  $\beta$ -анг лікаў

$\beta^0 \alpha^0 \leftrightarrow \beta$ -анг

$\alpha^2 | \beta^0 \alpha^0$



$\Lambda^0 | \beta^0 \alpha^0$



Валікі Кут Лікаў

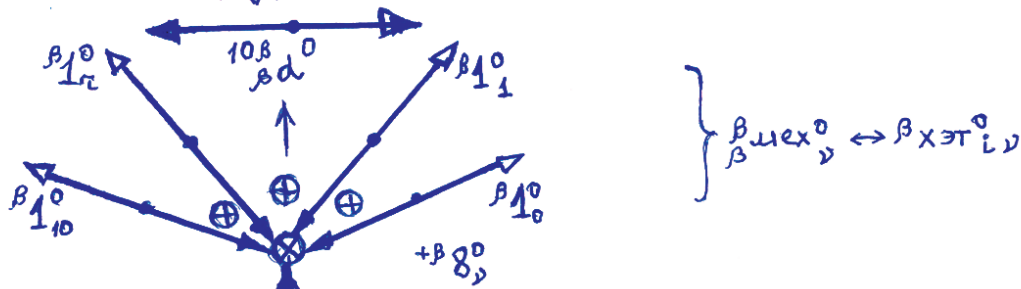
$\beta$ -анг у  $\Lambda^0$

$\beta \max^0 \leftrightarrow \beta \min^0$   
 мех  $\beta \uparrow 0$   
 план  $\beta \downarrow \tau$   
 мех  $\beta \downarrow \tau$   
 адзінікі туману

$\beta^0 \leftrightarrow \beta \{ \uparrow 0, \uparrow 1, \dots, \uparrow 10 \}^0$

Схемы  $\alpha^2 | \beta^0 \alpha^0$  і  $\Lambda^0 | \beta^0 \alpha^0$  - від повлікаў  $\beta^0$  у ліг  $\tau \geq 1^0$  калі лікі  $\tau \in \{1, \dots, 10\}^0$  выканані  $1^0 \max^0$ . Атрыманая адзінкі  $\beta \{ \delta_0, \dots, \delta_{10} \}^0$  туману  $\beta^0 \leftrightarrow \beta^0$  апынаюцца ў месцы туману і мэтаў дзе рапей дбей лік  $\Lambda^0$ . Усе адзінкі  $\beta^0$  множанча на ўсе астатнія адзінкі поля  $\beta^0$  і ўзнікае  $\beta$ -анг - хем уладу  $\Lambda^0$ . Махі адзінак туману - рэхавага я махаў  $\alpha$ -сістэм : у  $\beta$ -махах мех алонам і лізаца колы поля  $\beta^0$ , а іх хем алоны - калы памяці  $\beta^0$  дзе аказваюцца еім валыт у еім стывкаў у  $\beta^0$ , у  $\beta$  ліку - і руюм еім вал  $\beta$ -анга (які з чыгам гаеу ўклячае мовыя  $\beta$ -сістэм). Такім выкам усе лікі ведаюць лар поля  $\beta^0$ , зменіт шэрнаеці  $\beta^0$ , мееці і рух сістэм тутаральнай уладу, муюць узгадняць шэркі (у том ліку - гадзінікі), узв'яць ваць прапановы.

$\Lambda^0 | \beta^0$ :  $\mu C_{\beta}^{\beta} \rho_{\nu}^0 \leftrightarrow \mu_{\beta}^{\beta} \uparrow \downarrow \nu - \beta$ -мах, адзінкавы (нулявы) кут у  $\Lambda^0$



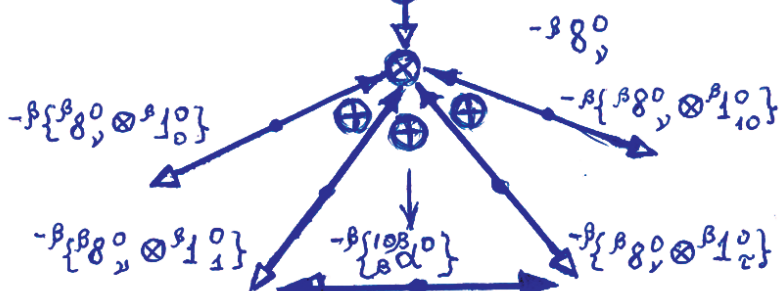
$\beta_{\text{мех}}^0 \leftrightarrow \beta_{\text{хэт}}^0 \nu$

$\beta$ -мах -  
-маса і  
маха ліка



$\beta 1_{\nu}^0 \leftrightarrow \beta \text{пан}^0$

$\beta \mu_{\nu}^0$  C - колер  $\beta$ -маха



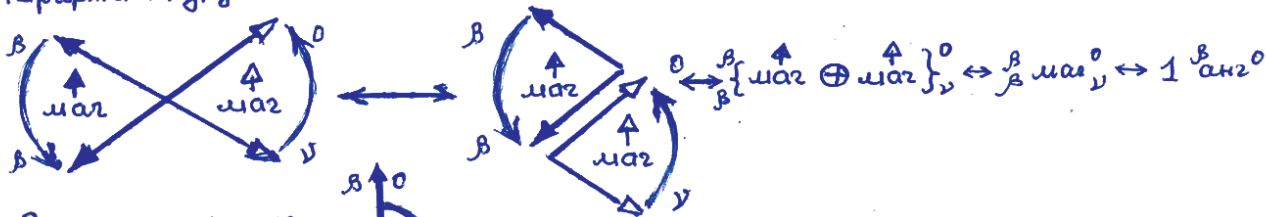
$\beta_{\text{хем}}^0 \leftrightarrow \beta_{\text{арх}}^0 \nu$

Механічны азон  $\beta_{\text{мех}}^0$ , адзінкі  $\beta_{\nu}^0 \leftrightarrow \beta_{\nu}^0$  - навакольнага свету  $\beta_{\text{хэт}}^0 \nu$ , яе крошчэнага ліка  $\beta 1_{\nu}^0 \leftrightarrow \beta_{\text{тэх}}^0 \nu$  у лік  $\beta \nu^0$ ; адзінка  $\beta 8_0^0$  мае стокі (рукі лічотанна) з адзінкамі туману лікаў навакольнага свету:  $\beta 2_0^0 \otimes \beta 1_1^0$ ,  $\beta 2_0^0 \leftrightarrow \beta 0, \dots, 10_0^0$  стокі (куты) складаюцца у орце хімернага ўладу  $10\beta \alpha^0$ ; Хімерны азон  $\beta_{\text{хем}}^0$ , адзінкі  $\beta 8_0^0$  - пашы  $\beta_{\text{арх}}^0$ : ліка  $\beta 1_{\nu}^0$  дзе ўзнікаюць сімвалы  $-\beta \{ \beta 8_0^0 \otimes \beta 1_{\nu}^0 \}$  стокі адзінкі  $\beta 8_0^0$  з лікаў яе механізму; сімвалы пашы складаюцца ў хемалоне адзінкі туману; восткі рыхаў складання - сімвал  $-\beta \{ \beta \alpha^0 \}$  ўладу ў  $\Lambda^0$  на лік  $\beta \nu^0$ .

$\beta \text{маг}^0$  - магнітуда  $\beta$ -маха



$\beta$ -мах - адзінкавы кут па лікаў  $\Lambda^0$  (магнітуды адзінкавых кутаў роўныя магнітуде нулявога кута (нулявой адзінкі)); і зражэння кут узнікае кабі стэрка маха крушчыва вакол ўладу, гэта - кут літэ стэркалі?



$\beta \mu_{\nu}^0$  C - колер  $\beta$ -маха

сіні колер  $\leftrightarrow \mu_c \leftrightarrow \mu_z \leftrightarrow$  чырвоны колер

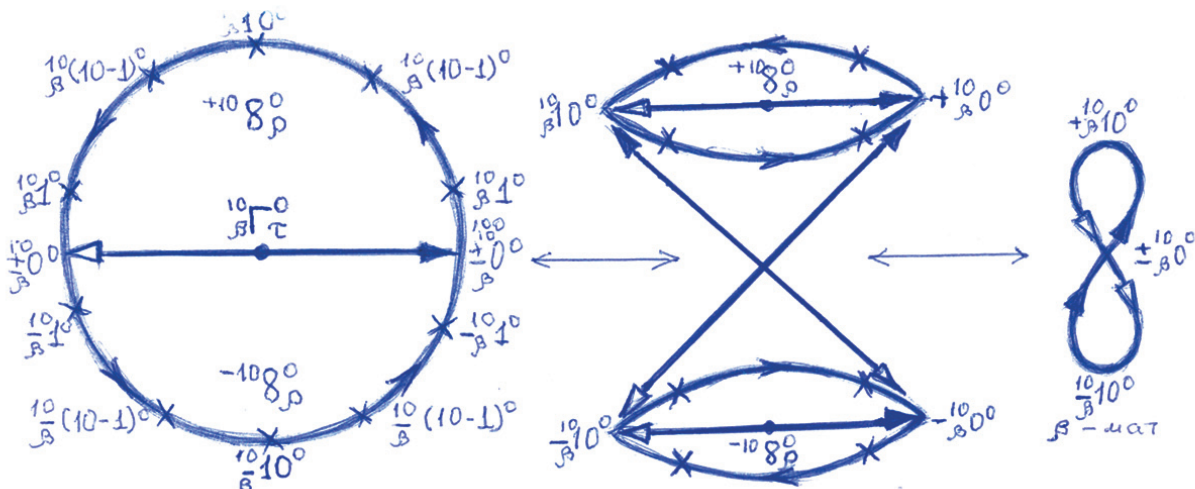
Колер ліка мае церку роўную вагу ліка ў яго механізме (у пай сістэмі лічотана свету). Колер  $\alpha$ -сістэмі лікаў узнікаюць кабі лікі сьвязваюць іх механізм. Колер ўладу ліка  $\beta \mu_{\nu}^0$  C  $\leftrightarrow 10^{-1}$  - чырвоны ате да белазя,  $10^{-1} \leftrightarrow 0 \leftrightarrow 1$  - магнітуда аднаго кола механізма ліка  $\beta 1_{\nu}^0$  - колькасць у іх адзінка лічотала метана  $\lambda \leftrightarrow -1$ . Сіні колер (ате да чэрнага)  $\leftrightarrow \beta \mu_{\nu}^0$  C  $\leftrightarrow 0-1$  - колер гуча, колер звычайнай адзінкі туману  $\beta 8_0^0$  гэі механізм (і цяг) - у пай туману (мэтан), у новай меркалаці.

Колер літэ сінім і чырвоным - колер літэ сьвязавых хімернаў якія лічоты (гаэткава) аднаўляць у іх працы здольнаць іх кривіць сьвязавы рэліт лічотана свету ч механізм (сьвязавы хімерон атрымлівае ад ліка-кривіць гаэтку механізма, а аэтаннае джымае саццэво колер роўны колькасці рэгаў лічотана свету якія ён уключіць).

Звычайныя  $\beta$ -махі - чыкавыя куты ў  $\Lambda^0$ , якія маюць нулявы колер, колер гуча, а чырвоны колер свету лікаў - мерка металаўладу  $\Lambda^0$ . Каляровыя  $\beta$ -махі - відавныя куты ў  $\Lambda^0$ , аснова відавнай дучкі ў пашы лікаў.







Гадзіннік  $10/βΓ°$  (10-я мернась ієрархічнага гадзінніка  $βΓ°$ ) працуе ў месцах граматыкі аэра  $A°$  (лікаў  $Λ°$ ):

- змяняе загадкавы лад туману поля практыкі  $+10/βΓ°$  на абвешны лад вядомых мерак (кушару, магнітуду, ...)
- аб'яву адзінак туману іх зместам;
- змяняе абвешны лад звестак поля  $+10/βΓ°$  на мерны лад вядомых (лічбных) схем – сімвалаў памяці  $-10/βΓ°$ ;
- прапануе сімвал новага свету і рухае прапановы лад у поле практыкі  $+10/βΓ°$  дзе ён шукае быць пакуючым (загадным) ладом у механічным агоке і вандроўным навукальным ладом у навукальных ці палях мехатона.

Ці знікаючы і жывы ладом адхілены практыкай у архіваў знікаючага ладу.

Гадзіннік  $10/βΓ°$  сцвярджае адзінку руху  $β1°$  ангі/міг  $↔ β1°$  мен (меркі механікі лікаў  $P°$ ) у колах руху  $+10/βΓ°$ ;  $-10/βΓ°$ ;  $+10/βΓ° ↔ +10/βΓ° \{+0↑ \rightarrow 10↓\} \rightarrow \{+10↓ \rightarrow +0↓\} \rightarrow +10/βΓ° \leftarrow -10/βΓ° \{-0↓ \rightarrow -10↑\} \rightarrow \{-10↑ \rightarrow -0↑\} \leftarrow -10/βΓ°$

Колі  $+10/βΓ°$  – месца ўзнікнення ў пакуючым свеце чыкава-каляровых кутуў аб'яву (працэс  $\{+0↑ \rightarrow 10↓\}$ ); іх знікнення – змятаньне ў памяць (працэс  $+10/βΓ° \rightarrow +0↓$ ).

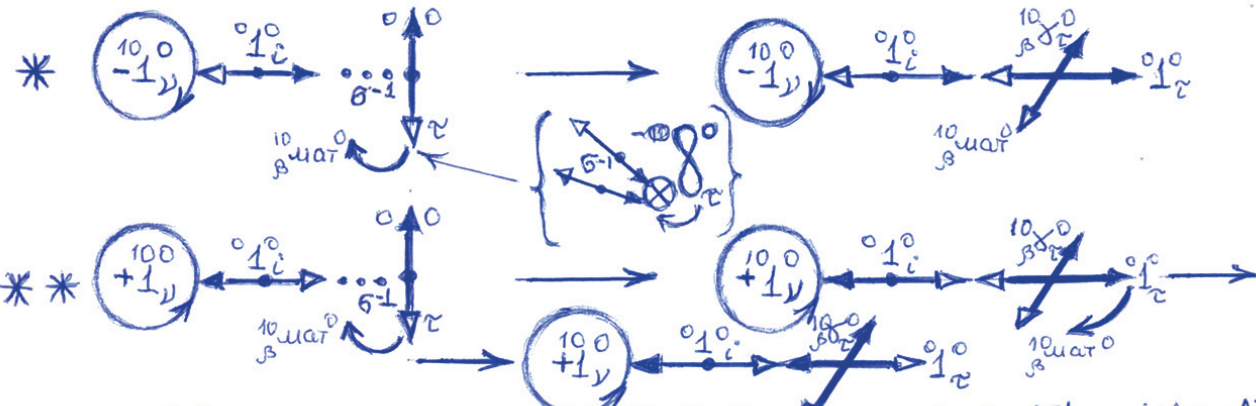
Колі  $-10/βΓ°$  – месца ўпамятку лічбных сімвалаў у памяці, іх актыўнага руху (меранна вынікаў практыкі), узнікнення сімвалаў прапановы новага свету і змятаньня іх у пакуючы свет.

Згаданыя колы звязаныя лікамі  $±10/βΓ°$  у мясца – механізме лікаў  $βΓ°$ .

βМат (механізм гадзінніка  $βΓ°$ ) чытае меркі гасу і магнітуды месцаў з пакуючага свету ў лічбных, у малымых колах і зноў у пакуючы свет. У адзінках зменот руху рэхаваць знакі гасячча і ў востры рух свету – гарга яго змен

$β1°$  ангі/міг  $↔ β1°$  -ангі/-міг  $↔ β1°$  мен

Механізм гадзінніка  $βΓ°$  уключваецца канцамі маха ліка якія вядуць працэс. У тумане  $βΓ°$  вядуць канцы – чэйны. Камі лік працуе з яго механічным агокам, вядуць канцы маха – светлы. Светлы канцы, як і чэйны, можа ўключваць механізм абаротаў маха, узнікнення кутуў і ортаў ладу. Вядуць канцы (чэйны ці светлы) можа актыўна вядуць вядомы канцы на выкананне працы вядувага.



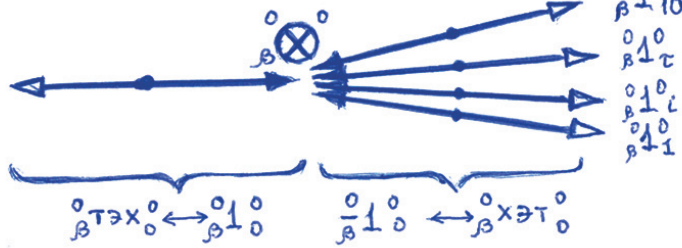
\* рухавы лік  $10/βΓ°$  уключвае ў яго механізм адзінку  $0/βΓ°$ ; вызваляе месца  $\{... \} ↔ β-1$  у полі лікаў  $Λ^4$  шукае заняць лік  $0/βΓ°$ ; светлы канцы ліка  $10/βΓ°$  працуе з механізмам і зараз ён вядуць; яго памяць  $-βΓ°$  мнотыцца на  $β-1$  (уключвае  $β-1$  у механізм) і складае астрышаны кутуў, лік  $10/βΓ°$  круціцца ў кірунку на  $10/βΓ°$  светлым канцам; у руху  $βΓ° \rightarrow 0$  узнікае орта лад  $10/βΓ°$ ;

\*\* лік  $10/βΓ°$  – натуральны; камі  $10/βΓ°$  займае месца  $β-1$  ліка  $0/βΓ°$ , светлы канцы маха ліка  $10/βΓ°$  аказваецца ў стыху са светлым канцам маха ліка  $0/βΓ°$ ; гэта супярэчыць сігналу  $βΓ°$  (натуральнага ліка  $10/βΓ°$ ); працяг вядувага шукае далей выключыць чэйны канцы маха ліка  $0/βΓ°$  які круціцца да ўзгоднаецца з загарады чэйны; чэйны канцы маха залюбавае лічбны кірунак круціцца яго светлым канцы, таму ў выніку орта лад залюбавае кірунак і магнітуду (на гэе да іх змятаньне ў памяць).

Закон ієрархічнага гадзінніка – закон вайска; які працуе і ў свеце  $Λ^4$

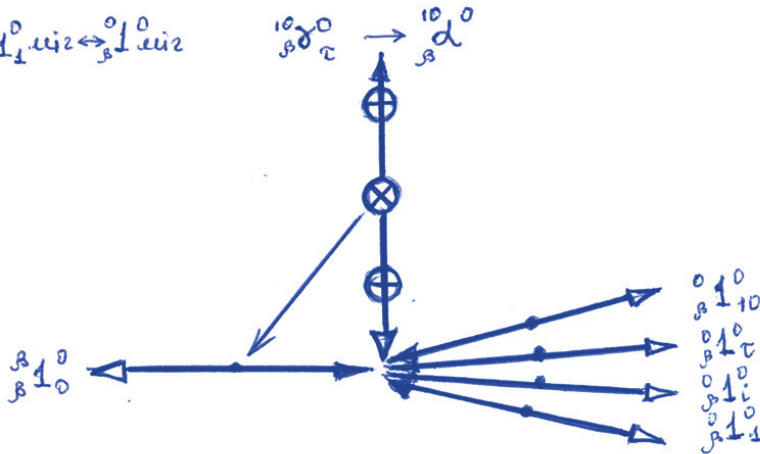
$\Lambda^0 |_{\beta d} P^0$  - механіка  $\beta$ -анга ў полі ладу пан-ліка  $\Lambda^0$

$$\begin{matrix} \beta \tau^0 \leftrightarrow \beta 1^0_{00} \text{ міз} \\ \beta 1^0_{00} \leftrightarrow \beta 1^0_{00} \end{matrix}$$



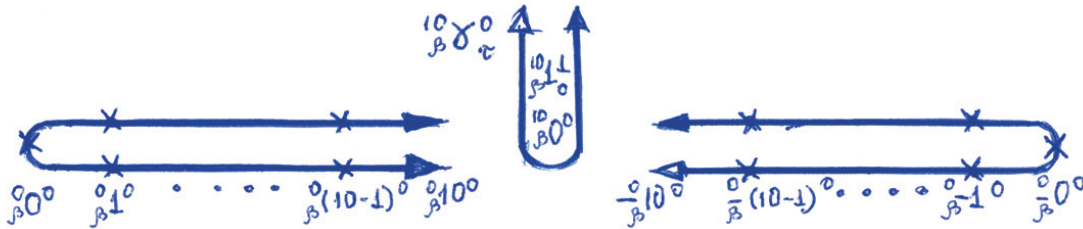
$$\begin{matrix} \text{маг}(\beta^0 \alpha^0) \leftrightarrow ? \\ \text{маг}(\beta^0 \chi^0) \leftrightarrow \beta^0 0^0 \leftrightarrow \\ \beta^0 1^0_{00} \end{matrix}$$

$$\beta \tau^0 \leftrightarrow \beta 1^0_{11} \text{ міз} \leftrightarrow \beta 1^0_{11} \text{ міз}$$



$$\begin{matrix} \text{маг}(\beta^0 \alpha^0) \leftrightarrow ? \\ \text{маг}(\beta^0 \chi^0) \leftrightarrow \beta^0 1^0_{11} \end{matrix}$$

$$\text{маг}(\beta^0 1^0_{00}) \leftrightarrow \beta^0 1^0_{00} \text{ анг} \leftrightarrow \beta^0 10^0 \quad \text{маг}(\beta^0 1^0_{00}) \leftrightarrow \beta^0 10^0$$



	$\beta^0 1^0_{00} \rightarrow \beta^0 \text{кон}^0_{10} \rightarrow \beta^0 \text{пан}^0_{10}$	$\beta^0 \chi^0 \tau^0$		$\beta^0 \text{мех}^0_{10} \leftarrow \beta^0 1^0_{00}$
$\beta^0 A^0$	$\beta^0 +0^0 \quad \beta^0 1^0 \dots \beta^0 (10-1)^0$	$\beta^0 1^0_{11}$	$\beta^0 0^0 \quad \beta^0 10^0 \quad \beta^0 (10-1)^0 \dots \beta^0 1^0$	$\beta^0 0^0 \quad \beta^0 1^0 \quad \beta^0 0^0$

$\beta \tau^0 \leftrightarrow \beta 1^0_{00}$  міз :  $\beta$ -анг у міз яш ўзнікнення (у адлік усеі ў  $\Lambda^0$  гэта міз  $\beta \tau^0 \leftrightarrow \beta 1^0_{00}$  міз), калі ўсе лікі паля  $\beta^0$  выканалі 1 мах. Меца мноства іх крывіцы апынацца мецамі іх поля туману і мэта з рухам складання  $\beta$ -ўладу  $\beta \alpha^0$  і метаўладу  $\beta \chi^0$ .

$\beta \tau^0 \leftrightarrow \beta 1^0_{11}$  міз : адзінка туману  $\beta 1^0_{00}$  ліка  $\beta 1^0_{00}$  уключае орт ладу  $\beta \chi^0 \tau^0$  і выконвае акты ўладу (мноства і складання) ў се механічнымі сіламі які атрымаў з се наваксынага свету.

Адзінка  $\beta 1^0_{00}$  - асноўная адзінка туману (меца ў  $\beta$ -ангу) ліка  $\beta 1^0_{00}$  які (адзінка пан-ліка) прапануе ўсе сістэмы ўладу ў  $\Lambda^0$  - тутаральнай (ўзорнай і асветнай) і татаальнай. Схема  $\Lambda^0 |_{\beta d} P^0$  - схема руху  $\beta$ -анга прапанаваная з'яўдзенымі лікамі - пан-лікац свету  $A^0 \leftrightarrow A^0$ .

Хмары туману  $\{\beta \tau^0\}$  лікаў  $\{\beta 1^0_{\tau}\}$  (хмары іх кантактаў) могуць узнікаць у розных месцах свету  $A^0$ . Але асноўнае меца ўсе мусяць абмяркоўвацца (узвартвацца) прапанаванымі метаўладу -  $\beta$ -анг.

$\Lambda^0 \alpha \beta \rho^0$

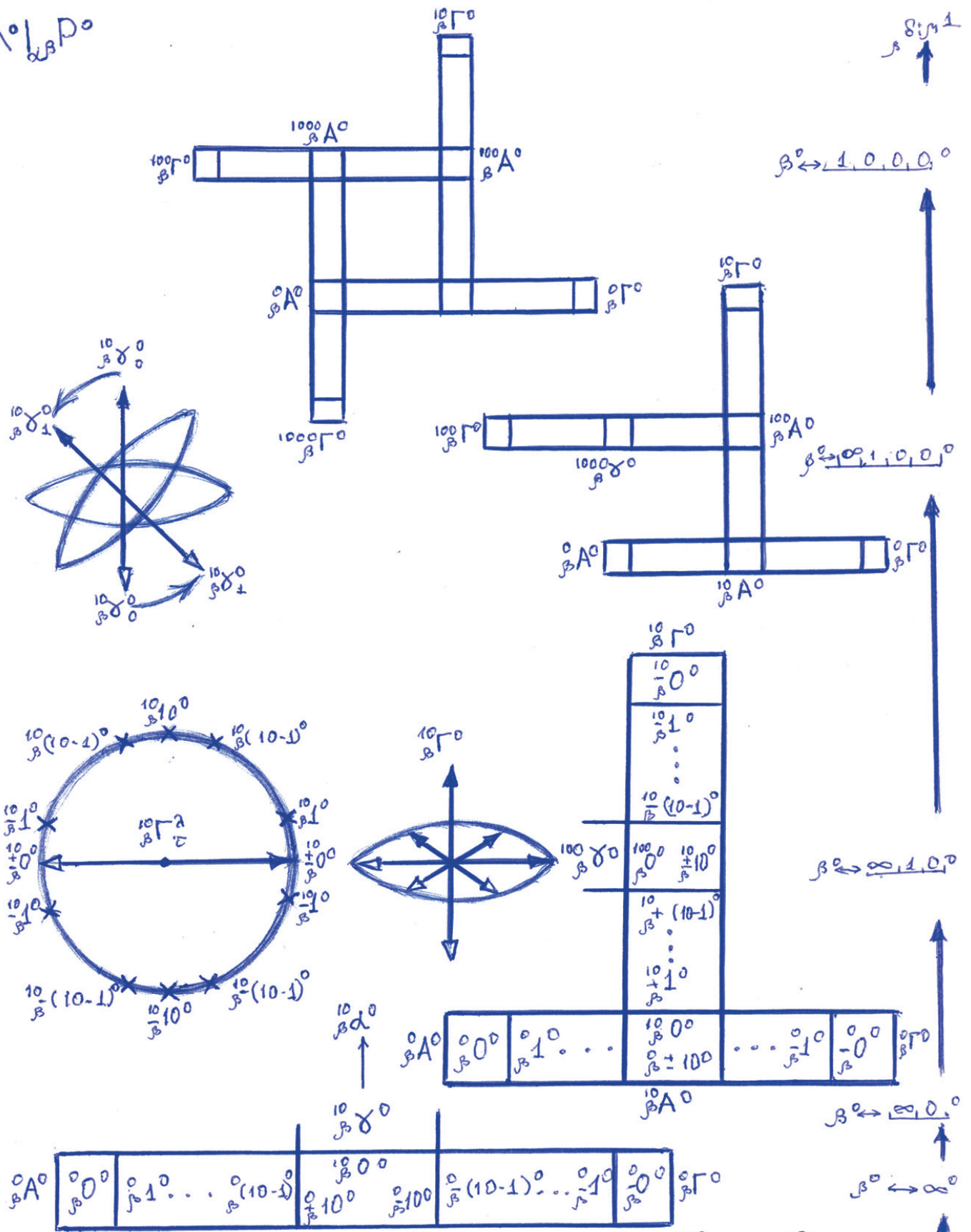
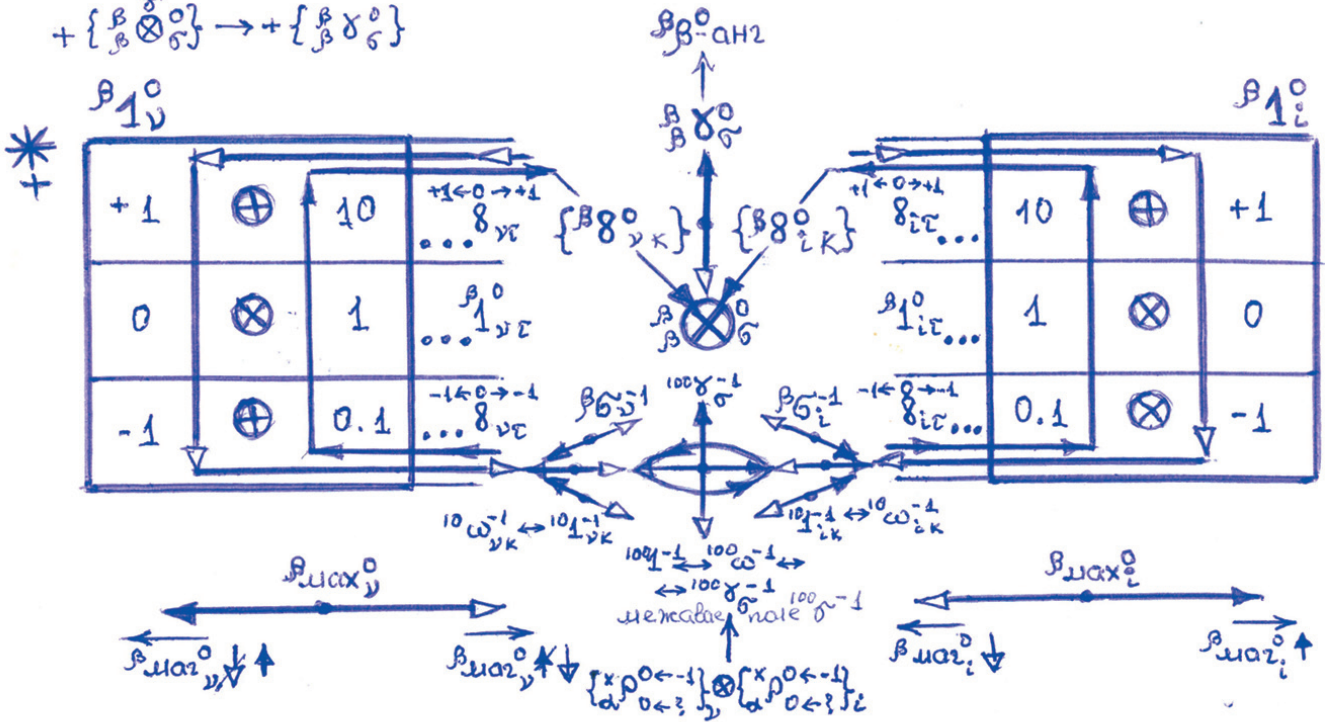


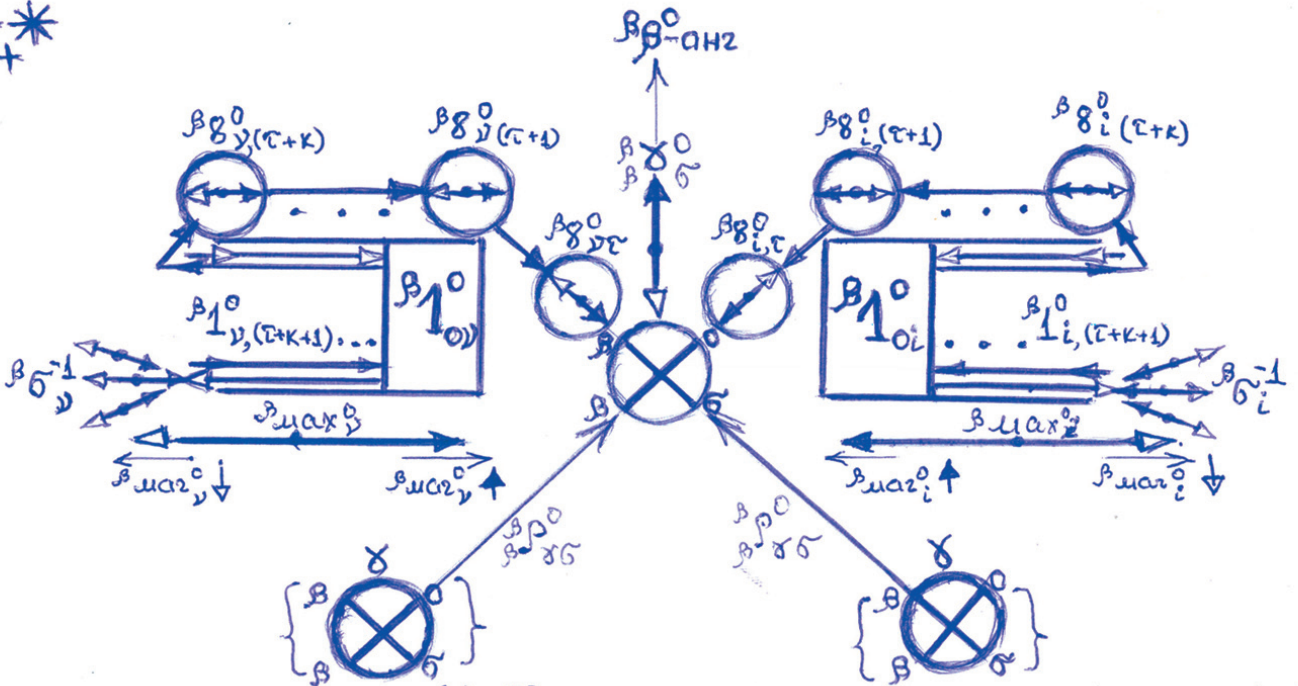
Схема  $\Lambda^0 \alpha \beta \rho^0$  - рух уздовж мернаці  $\beta \delta \rho^0 \rightarrow$  пануючого ладу (ладу  $\beta \Gamma^0$  пан-ліка  $\Lambda^0$ ) у метсах  
 Валікага Кута  $\Lambda^0$  каў -  $\beta$ -анга.  
 Стокі  $\beta \delta^0$  адзінак туману  $\beta \delta^0 \leftrightarrow \beta 1^0$  - куты (гукі) рознай мернаці. Гадзімнік  $\beta \Gamma^0$  і  $\beta \delta \rho^0$   
 адд-працэсар  $\beta A^0$  (лігільнік) - законы і механізмы змены куту рознай мернаці.  
 Вялікі кут узнікае ў ліг выкасту поля  $\beta^0$  адзінак  $\{\omega^0\} \leftrightarrow \{1^0\}$  - у ліг меншасці  
 крэннічнай уладот  $\Lambda^0$  свету лікаў  $\Lambda^0$  і ў яе мейст - у полі моты рзе ў тумане  $\beta \delta^0$   
 мурець у знікаць метаўлада лікаў  $\Lambda^0$ . Гэта мейст лікаў гукі і в'ідаў.  $\beta$ -анг  
 антнацца ў пашаці ўей лікаў поля  $\beta^0$  і дае магчымаць узгадняць іх меркі.

$\Lambda^0 | \beta^0 \rho^0 : \{ \beta^0 \delta^0 \} \rightarrow \{ \beta^0 \gamma^0 \} -$  хмары вандруйнай улады  $\bar{\Lambda}^0$

$+ \{ \beta^0 \delta^0 \} \rightarrow + \{ \beta^0 \gamma^0 \}$



\*\*



\* - працэс узнікнення хмары  $\{ \beta^0 \delta^0 \}$  - стыхай адзінак туману, хімернай улады лікаў;  
 + натуральныя лікі  $\beta^0, \delta^0$  рухаюцца светлымі канцамі іх махаў у адно месяца поля  $\delta^{-1}$ ;  
 адзінка  $10^1 \omega^{-1} \leftrightarrow 10^0 \omega^{-1}$  гэтага месяца апынаецца ў стыху гокаў руху навураўняня:

$$\{ \{ \alpha^0 \rho^0 \leftarrow -1 \} ; \{ \alpha^0 \rho^0 \leftarrow -1 \} ; \nu \} | 10^0 \omega^{-1} \rightarrow 10^0 \omega^{-1} \rightarrow 10^0 \gamma^0 \delta^0$$

згодна з законам іерархічнага гадзімкіма (законам вайўека) кірумак і шэрнаеца адзінкі  $10^0 \omega^{-1}$  змяняецца:  $10^1 \omega^{-1} \rightarrow 10^0 \omega^{-1}$ ; яно спыняе гоніт руху навураўняня;  
 махі лікаў  $\beta^0, \delta^0$  круцяцца адзін да аднаго іх цёмнымі канцамі і ў гэтым месяцы ўзнікае хмара адзінак туману;

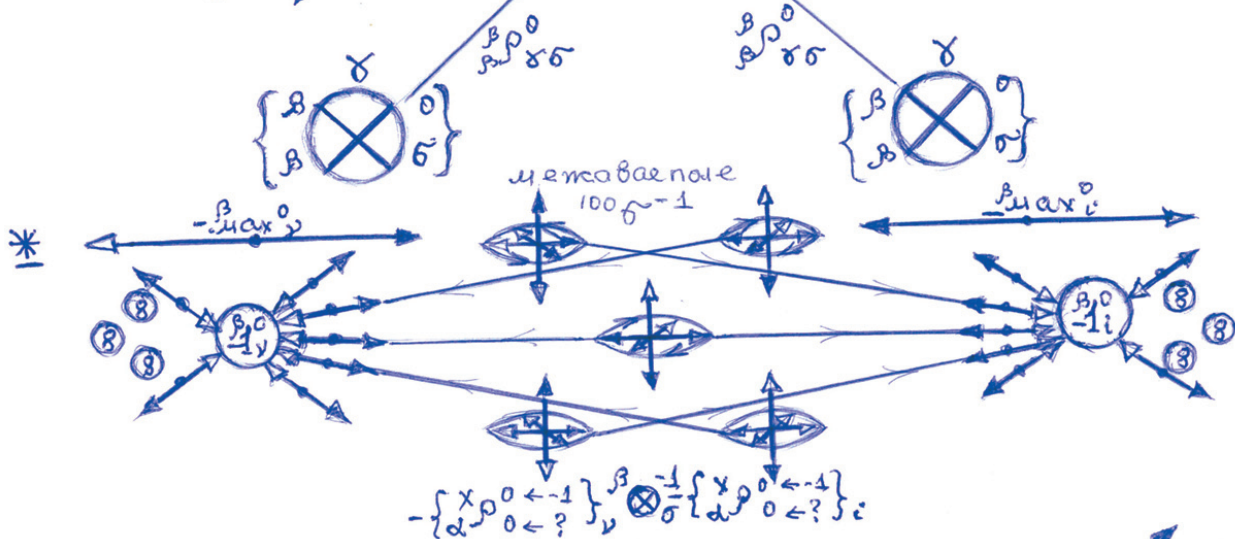
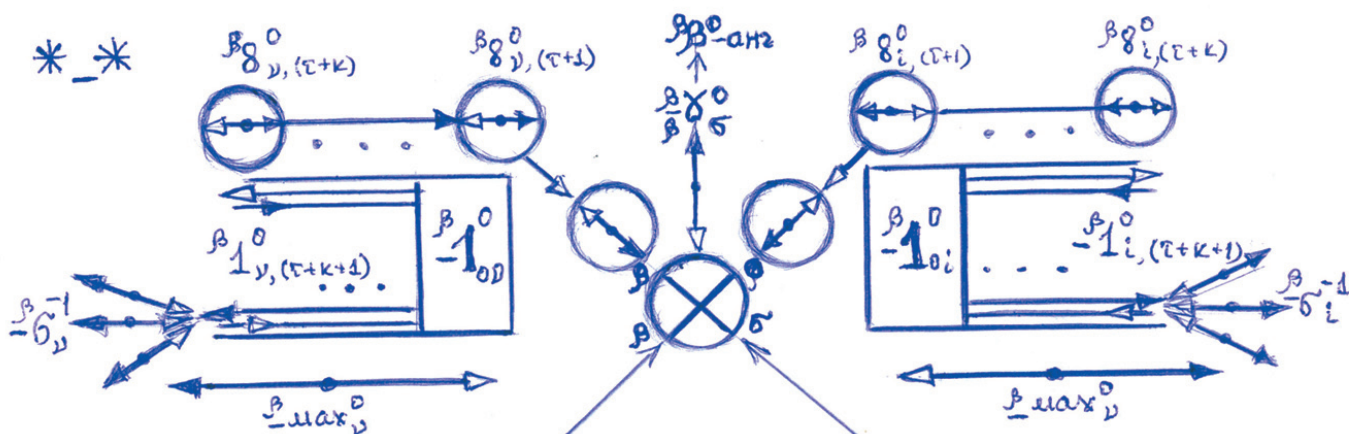
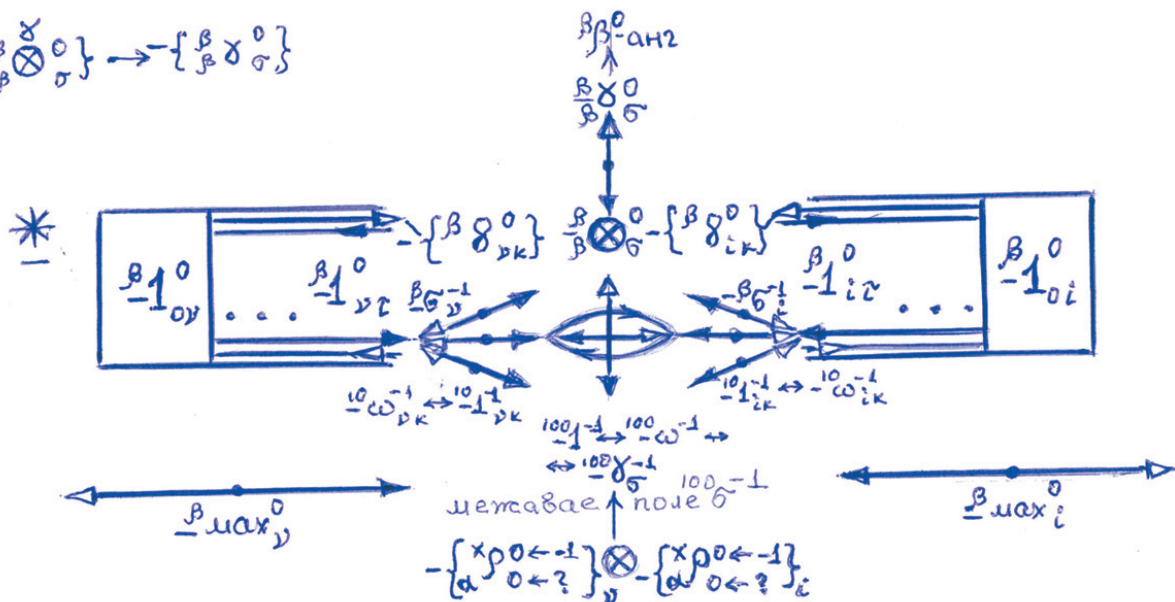
\*\* - працэс узмацнення хмары і яе рух  $\beta^0 - \text{анг}$ ;  
 + адзінкі туману  $\{ \beta^0 \delta^0 \}, \{ \beta^0 \gamma^0 \}$  лікаў  $\beta^0, \delta^0$  сцягваюцца ў месяцы стыха цёмным канцаў махаў і бошмаквалючы рухі абменьу

$\{ \beta^0 \delta^0 \} \rightarrow \{ \beta^0 \gamma^0 \} \leftrightarrow$  хімерная улада  $\bar{\Lambda}^0$

узнікае хмара екаванай (хімернай) улады якай рухаецца ў  $\beta^0 - \text{анг}$  з мэтай ўжыткае ў яго; рух  $\beta^0 - \text{анг}$  вытывае месяца ў полі  $\delta^{-1}$ ; у працэсе руху да хмары  $\{ \beta^0 \delta^0 \}$  маюць давураўняня нобле вандруйнай хмары улады.



$$-\left\{ \beta \otimes \delta \begin{matrix} 0 \\ \sigma \end{matrix} \right\} \rightarrow -\left\{ \beta \delta \begin{matrix} 0 \\ \sigma \end{matrix} \right\}$$



{\*, \*\*} - процесу утворення і зменшення хмари вандрувальної умови ррхавих ліній  $-1_{0y}, -1_{0z}$  у ррхавих лініях однієї тумани узнікають у світлий канцях їх махачу, а чеймний канцях працюють з механічними агоніями; у асаттійм згаданій працюють адролька вонд з працюємі у натуральних лініях, хмари тумани ррхавих ліній можуть змуданча з хмарамі натуральних у руху у  $\beta$ -анг.

$\Lambda^0 | \beta^0 : \{ -\beta^0_{\alpha}, -\beta^0_{\alpha} \}$  - рух прапановаў  $-\beta^0_{\alpha}$  і знікаючага  $-\beta^0_{\alpha}$  ладу ў тумане памяці  $-\beta^0_{\alpha}$  ліка  $\beta^0_{10}$

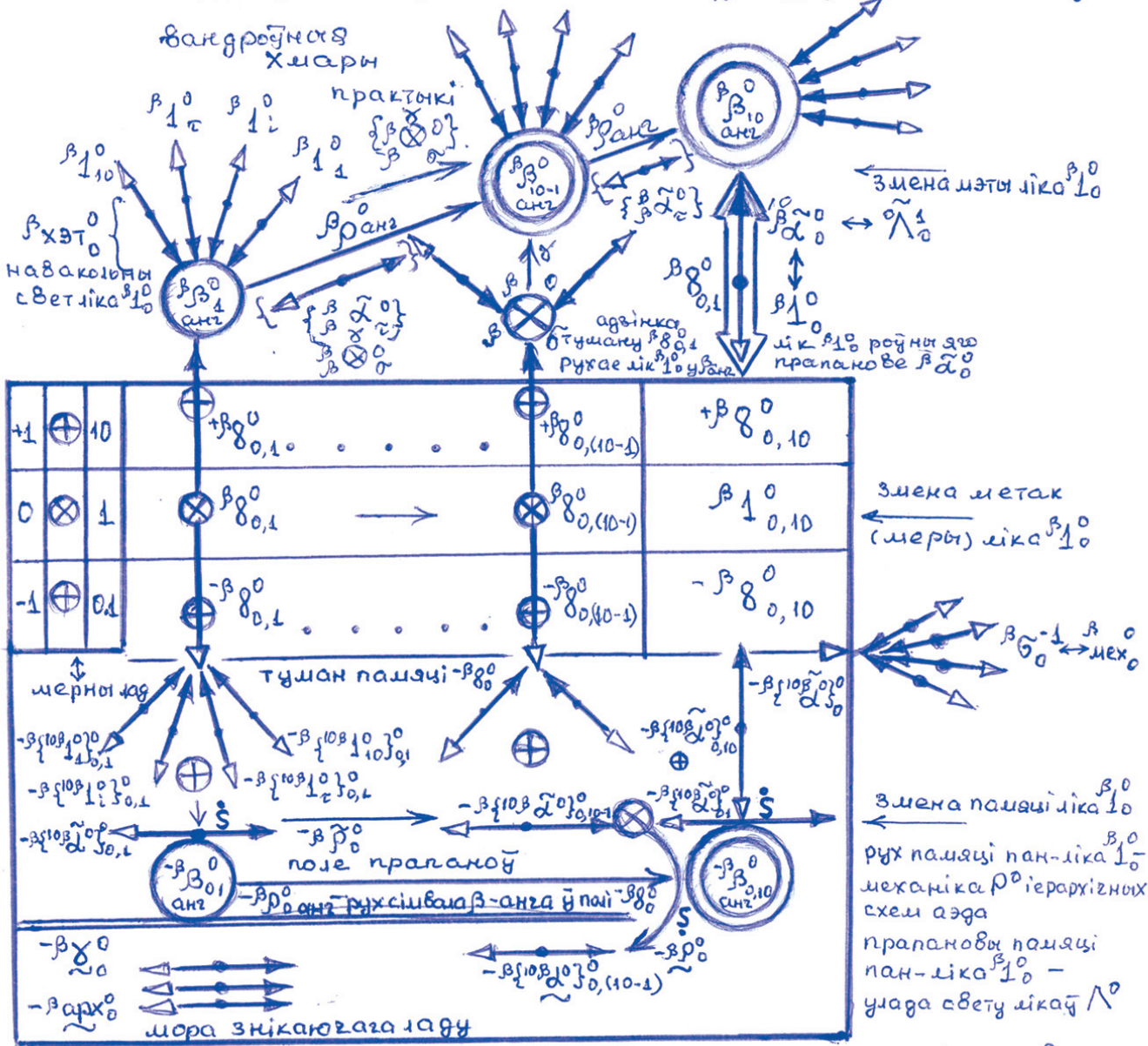
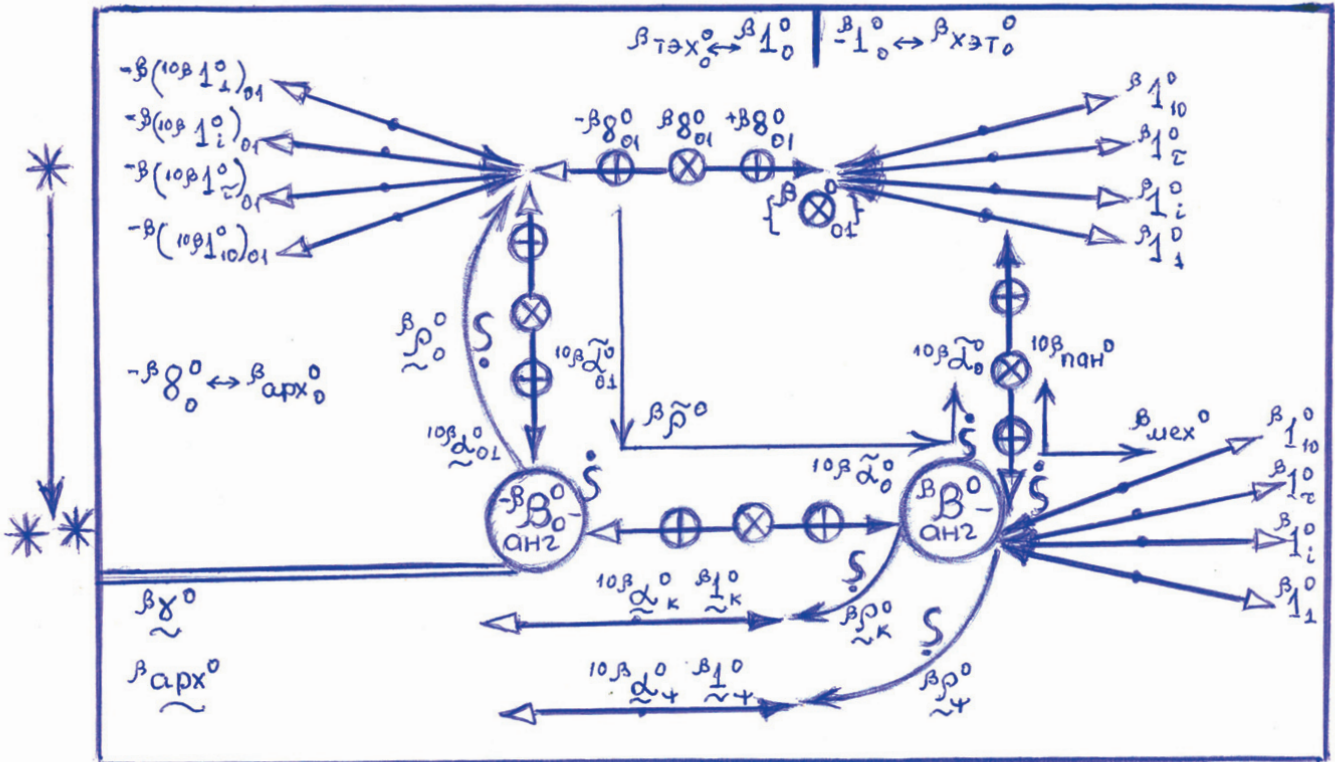


Схема  $\Lambda^0 | \beta^0 : \{ -\beta^0_{\alpha}, -\beta^0_{\alpha} \}$  - рух  $-\beta^0_{\alpha}$  памяці  $-\beta^0_{\alpha}$  пан-ліка  $\beta^0_{10}$  - рух прапановы  $-\beta^0_{\alpha}$  і улада свету лікаў  $\Lambda^0$ .  
 прапановы  $-\beta^0_{\alpha}$  і памяці адзінак туману  $-\beta^0_{\alpha}$  маюць стыкі з сімвалам  $\beta$ -анга  $\beta^0_{\alpha}$  які прапанова ўключае і змяняе сімвал  $\beta$ -анга, яна лічыцца воднай і атрымае сваю метку воднае  $\beta$  (знікаючы лад); прапанова якая ўключаецца ў воднай змяняе сімвал  $\beta$ -анга, мае метку  $\beta$  (знікаючы лад) і рукамі  $-\beta^0_{\alpha}$  дазваляе да адзінак прапановы ў архіве  $-\beta^0_{\alpha}$  знікаючага ладу  $-\beta^0_{\alpha}$ ;  
 водная прапанова рукамі  $-\beta^0_{\alpha}$  разам са змененымі сімвалам  $\beta$ -анга рукамі  $\beta^0_{\alpha}$  канец ліка  $\beta^0_{10}$ ; тады збіраюцца і складаюцца ўсе водная прапановы;  
 водная прапанова  $-\beta^0_{\alpha}$  і  $-\beta^0_{\alpha}$  складаюцца ў прапанову  $-\beta^0_{\alpha}$  ліка  $\beta^0_{10}$  і лік з гэтай прапановай рукамі  $\beta^0_{\alpha}$  у поле маты дзе ён музіць быць узвасаны ў стыку з  $\beta$ -ангам уява свету лікаў; калі ён атрымае метку  $\beta$  - ён уключае  $\beta$ -анга, змяняе яго (і разам з ім паміць усе лікаў) і атрымае ўлада свету лікаў; калі ён атрымае адзнаку  $\beta$ , гэты лік музіць рукамі  $\beta^0_{\alpha}$  знікаючага ладу  $-\beta^0_{\alpha}$  усяго поле лікаў  $\beta^0_{10}$ ;  
 рух ліка  $\beta^0_{10}$  у  $\beta$ -анга выконвае адзінак туману  $\beta^0_{\alpha}$ , яна - мейтз  $\beta$ -анга з ліка яго ўзнікнення і згаданых рух выконвае за  $\beta^0_{10}$  лік;  
 $\beta$ -анга змяняецца ў працэсе ўключэння ў яго прапановы  $\beta$  і шэражнай улада  $\beta^0_{\alpha}$  які ўзнікаюць у хмарах практыкі - хмарах адзінак туману  $\beta^0_{\alpha}$  за меткамі  $\beta$ -анга; асноўнае змяненне  $\beta$ -анга (включэнне яго схематэ азда і ўздым яго мернае) выконвае лік які ў стыку апінаецца пан-лікам свету  $\Lambda^0$ .

$\Lambda^0 | \beta P^0: \{\beta \tilde{\rho}^0, \beta \tilde{r}^0\}$  - рух пралапоўнага  $\beta \tilde{\chi}^0$ ; знікаючага  $\beta \tilde{\chi}^0$  ладу ў тымане  $\beta \tilde{\rho}^0$



\* адзінка тыману  $\beta \tilde{\rho}^0$  ліка  $\beta 1^0 \leftrightarrow \beta \tilde{\chi}^0$  мае стыкі  $\{\beta \tilde{\rho}^0\}$  з палем практыкі  $+\beta \tilde{\rho}^0$  з навакольным светам  $\beta \tilde{\chi}^0$  ліка  $\beta 1^0$ ; вынікі стэкаў атрымліваюць мерныя сімвалы  $-\beta \{10 \beta 1^0\}_2, \dots, 10 \beta 1^0 \tilde{\rho}^0$  у памяці  $-\beta \tilde{\rho}^0$ ; памяць  $-\beta \tilde{\rho}^0$  (поле душкі, навукі) пралапуе сімвал  $10 \beta \tilde{\rho}^0$  уладу свету;

\*\* пралапова

- рухаецца ў лэту цёмным канцом маха;
  - мяціцца знакам пралапоўнага ладу  $\{\tilde{\rho}^0\}$ ;
  - сімвал аэра  $\Lambda^0$  (і свету  $\Lambda^0 \leftrightarrow \Lambda^0, \Lambda^0 \leftrightarrow \Lambda^0$ ) мае лэгі пралаповы руху памяці (навукі);
  - мяціцца знакам ранга (мернасьці): хімерызная джава, тутаралжная (ўзорная ці асветная) і татаальнаф; муеіць уключыць мясцы зменой свету, рух змены свету, рух меранна б'ласнай годнасьці і рух уласнай змены;
  - мяціцца знакам годнасьці ў працэсе стэка з сімвалам  $\beta$ -анга ў памяці ліка  $\{\beta \tilde{\rho}^0 - \text{анг}\}$ , з  $\beta$ -ангам свету  $\{\beta \tilde{\rho}^0 - \text{анг}\}$  і з палем практыкі  $\{\beta \tilde{\chi}^0\}$ ;
- знакі годнасьці:  $\tilde{\rho}^0$  - годная пралапова (ўзнікаючы лад),  $\tilde{\rho}^0$  - знікаючая пралапова
- знак  $\tilde{\rho}^0$  на сімвале  $\beta$ -анга - знак змены памяці і мэты - у мэтах уласнага ладу ліка  $\beta 1^0$  (стэка з  $\beta \tilde{\rho}^0 - \text{ангам}$ ) ці памяці і мэты ў іх сістэмі свету (стэка з  $\beta \tilde{\rho}^0 - \text{ангам}$ );
- знак  $\tilde{\rho}^0$  на сімвале навакольнага свету  $\{\beta \tilde{\chi}^0\}$  - знак змены  $\beta \tilde{\chi}^0$  на  $\beta \text{мех}^0$ , а  $10 \beta \tilde{\rho}^0$  - на  $10 \beta \text{пан}^0 \leftrightarrow 10 \beta \tilde{\rho}^0$ ;
- знак  $\tilde{\rho}^0$  на сімвале руху  $\beta \tilde{\rho}^0$  - знак адхіленьня пралаповы ліка  $\beta 1^0$ ; вяртаньня ліка  $\beta 1^0$  зноў у стан  $\beta \tilde{\chi}^0$ ; адхіленьня пралапова застаецца ў мэтах ліка  $\beta 1^0$ ;
- знак  $\tilde{\rho}^0$  на сімвалах руху  $\beta \tilde{\rho}^0_k, \beta \tilde{\rho}^0_{\tilde{\chi}}$  - знак адхіленьня пралапоў лікаў  $\beta 1^0_k, \beta 1^0_{\tilde{\chi}}$   $\beta$ -ангац свету і палем  $\beta \tilde{\chi}^0_{\tilde{\chi}}$ ; у такім разе лікі  $\beta 1^0_k, \beta 1^0_{\tilde{\chi}}$  рухаюцца (разам з іх адхіленьнямі пралаповалей ў архіў  $\beta \text{арх}^0$  знікаючага ладу  $\beta \tilde{\chi}^0$ ; згаданьня лікі страйваюць магільнасць пралапоўдаць уладу свету, разам з імі ў  $\beta \text{арх}^0$  трапляюць іх мех агонь; знікаючы лад  $\beta \tilde{\chi}^0$  не аднаўляецца метаўладай;

Прапапова лічыцца годнай (знак  $\tilde{\rho}^0$ ) калі ў стэку з  $\beta$ -ангам яна змяняе яго і ўключае ў мэты ўласнай памяці (годная пралапова  $10 \beta \tilde{\rho}^0$  у выніку мае стэка з  $\beta$ -ангам светлым канцом з маха - мясцы памяці). Прапапова, якая ўключае  $\beta$ -ангі і змяняе яго, уключае і змяняе аснову памяці і поле стэкаў у іх лікаў. Яна лічыцца годнай у практыцы калі выканала акт ўладу (шкортамне і складаньня) ў памі  $\beta \tilde{\chi}^0$ . У такім разе з яе здымаецца знак пралаповы і зна лічыцца гэтай уладай:  $10 \beta \tilde{\rho}^0 \rightarrow 10 \beta \tilde{\rho}^0 \leftrightarrow 10 \beta \text{пан}^0$ , а поле  $\beta \tilde{\chi}^0$  апынаецца з мех агоням.

Знікаючы лад  $\beta \tilde{\chi}^0$  мае характэрныя адзнакі: адметнасьць ведаў, мэты, душкі і/ці складаньня, ўздышчу мернасьці і мэталя, ухіленьне ад адмеркаваньня і ўзвасцьваньня (закрытыя зоны, схаваньня хібі, маха), рух у поле мэты светлым канцом маха - загадным ладам.

Вялікая колакасьць сістэмі знікаючага ладу  $\beta \tilde{\chi}^0$  ў  $\beta \text{арх}^0$  - вынік загадкавасьці законаў метаўлады ў полі тыману. (За выключэньнем вядурай адзінкі, з мех агоня, з гонаў руху навуцаньня і сістэмі ўключаньня ў зь натуральную гісторыю, у знікаючы лад трапляюць усе сістэмы поля  $\beta \tilde{\rho}^0, \beta \tilde{\chi}^0$ ).

$\Lambda^0 \beta^0 \rho^0$  - рухи у полях  $\beta^0 \lambda$ ,  $\lambda \leftrightarrow \{ \dots -1 \rightarrow 0 \rightarrow 1 \dots \}$

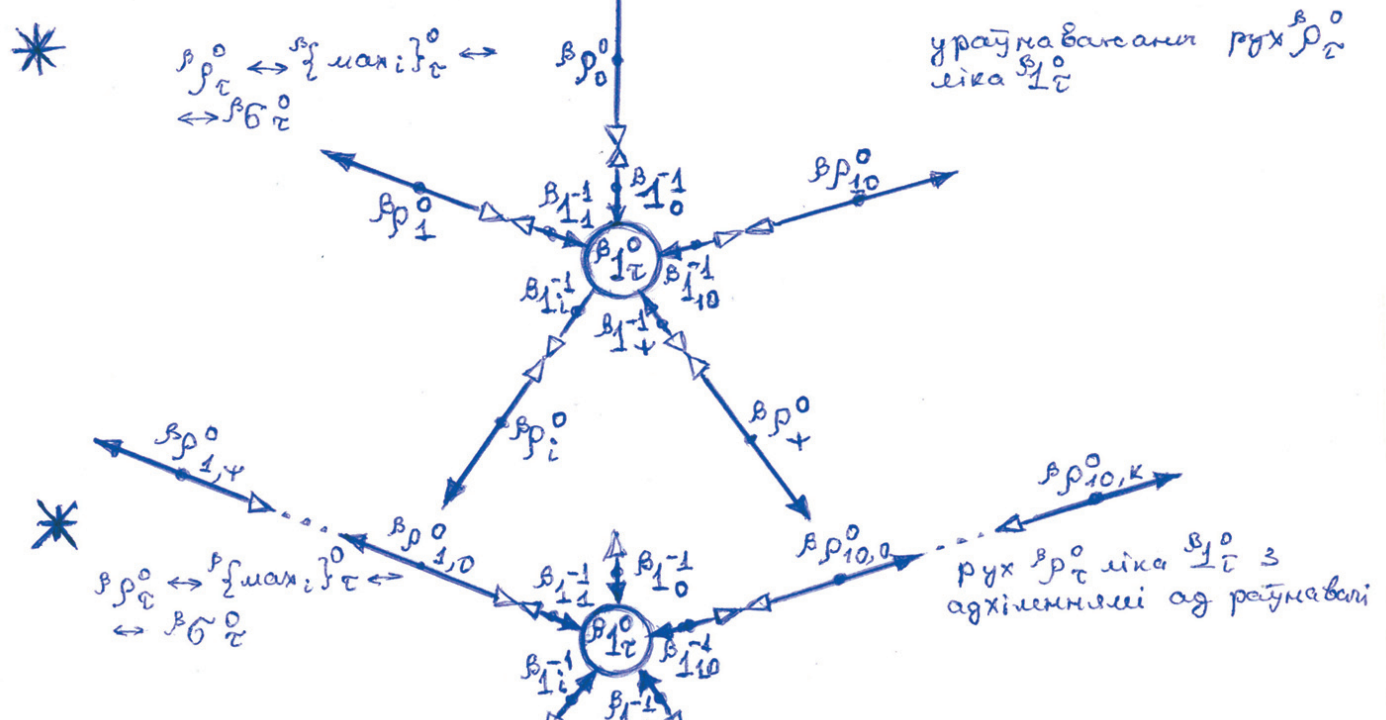
Рухи  $\beta^0 \rho^0$  лікаў  $\beta^0$  виконваюцца ў межах ортай  $\beta^0 \lambda \leftrightarrow \{ 0 \Lambda^0, 10 \Lambda^0, 100 \Lambda^0, 1000 \Lambda^0 \}$  пан-ліка  $\Lambda^0$  і маюць лікавыя меркі махаў (адзінак руху) і схем махаў.

Схемы  $\beta^0$  махаў (варта, кола, звяз, сьвяз) мернасьці  $\beta^0$  - гэта схем хмары (множнага ліку)  $\beta^0 \rho^0$  рухаў  $\{ \beta^0 \rho^0 \}$  поля  $\beta^0$  мернасьці  $\beta^0$  у працэсе яго сьвязвання ў адзінку (орт)  $10 \beta^0$  новай мернасьці  $10 \beta^0$ :

$$\{ \beta^0 \rho^0 \} \leftrightarrow \{ \beta^0 \text{мах}^0 \} \leftrightarrow \beta^0 \rho^0 \rightarrow 10 \beta^0 \text{мах}^0 \leftrightarrow 10 \beta^0 \rho^0$$

Месцы (у махі) схем  $\beta^0 \rho^0$  - рухі аднаго ці многіх лікаў якіх пусьць узгаднаны іх працу. Схемы  $\beta^0 \rho^0$  рухаў  $\{ \beta^0 \rho^0 \}$  маюць над  $\beta^0 \rho^0$  - меркі іх годнасьці  $\beta^0 \rho^0$ , іх стокі, законы іх узнікнення, дзейнасьці і змены ў працэсе уздымаў мернасьці.

Узоры згаданых схем - стокі  $\beta^0$  махаў адзінак  $\beta^0$  поля  $\beta^0$  у хмарах іх цэлінамі канцамі (у тым ліку - ў хмары  $\beta$ -анга) ці светлымі - у працэсе ўзнікнення вандруйнай хмары ладу. Гэты працэс зьяняе кірункі рухаў - хмара апынаецца месцам мэты (хімерычнай улады  $\beta^0 \rho^0 \rightarrow \beta^0 \rho^0$ ) і махі разьортваюць у яе месца іх цэлінамі канцы. Працэс узмацнення хмары будзе да змены меркі рухаў - узмацнае іх адхіленьне ад раўнавагі. Ураўнаважаньне рух і рух з адхіленьнем ад раўнавагі азнакамы схемамі \* і \*:



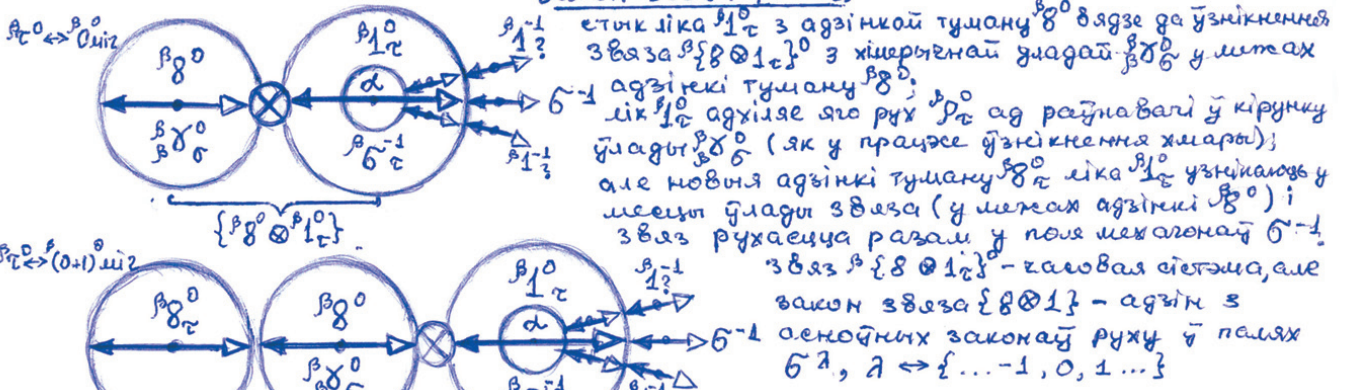
Лік  $\beta^0$  мае мехалон  $\beta^0 \text{мах}^0 \leftrightarrow \beta^0 \tau^0 \leftrightarrow \{ 10, \dots, 10^0 \}^{-1}$  з магнітудай  $\rho^0 \leftrightarrow 10^0$ ; усе лікі  $\{ \beta^0 \tau^0 \}$  мехалона  $\beta^0 \tau^0$  азнакаюць магнітуды кірункі  $\{ \beta^0 \tau^0 \} \rightarrow \{ \beta^0 \rho^0 \}$  рухаў (махаў) ліка  $\beta^0$ ; іерархічныя нумары  $\{ \beta^0 \tau^0 \}$  лікаў  $\{ \beta^0 \tau^0 \}$  размеркаваныя ў ортах ладу  $\beta^0 \tau^0$  мехалона  $\beta^0 \tau^0$ ; іх нумары (з зашкай мехалона  $\lambda \leftrightarrow -1$  ка  $\lambda \leftrightarrow 0$ ) - лікавыя іерархічныя нумары кірункаў руху ліка  $\beta^0$  у полі механічных алонаў  $\beta^0$ ; у гэтых кірунках узнікаюць адзінакі туману  $\beta^0 \rho^0$ .

\* Рух ліка  $\beta^0$  ураўнаважаньне камі за  $\beta^0$  лікаў лік  $\beta^0$  вонкае  $\beta^0$  мах у кірунку  $\beta^0$ ,  $\beta^0 \leftrightarrow \beta^0, \dots, 10^0$ ; у такім разе хуткасьць руху  $\beta^0 \rho^0$  у кірунку  $\beta^0$  раўнава  $\beta^0 \rho^0$  /  $\beta^0 \rho^0$  мен  $\beta^0 \rho^0 \leftrightarrow \beta^0 \rho^0$  /  $\beta^0 \rho^0$  мен  $\beta^0 \rho^0$  мен

- \* Рух ліка  $\beta^0$  адхіленьне ад раўнавагі:
- кірункі  $\beta^0$
  - $\beta^0 \rho^0 \leftrightarrow \beta^0 \rho^0$  анг /  $\beta^0 \rho^0$  міз  $\leftrightarrow \beta^0 \rho^0$  мен
  - $\beta^0 \rho^0 \leftrightarrow \beta^0 \rho^0$  анг /  $\beta^0 \rho^0$  міз  $\leftrightarrow \beta^0 \rho^0$  мен
  - $\beta^0 \rho^0 \leftrightarrow \beta^0 \rho^0$  анг /  $\beta^0 \rho^0$  міз  $\leftrightarrow \beta^0 \rho^0$  мен
  - $\beta^0 \rho^0 \leftrightarrow \beta^0 \rho^0$  анг /  $\beta^0 \rho^0$  міз  $\leftrightarrow \beta^0 \rho^0$  мен
  - $\beta^0 \rho^0 \leftrightarrow \beta^0 \rho^0$  анг /  $\beta^0 \rho^0$  міз  $\leftrightarrow \beta^0 \rho^0$  мен
  - $\beta^0 \rho^0 \leftrightarrow \beta^0 \rho^0$  анг /  $\beta^0 \rho^0$  міз  $\leftrightarrow \beta^0 \rho^0$  мен
  - $\beta^0 \rho^0 \oplus \beta^0 \rho^0 \leftrightarrow \beta^0 \rho^0$  анг /  $\beta^0 \rho^0$  міз

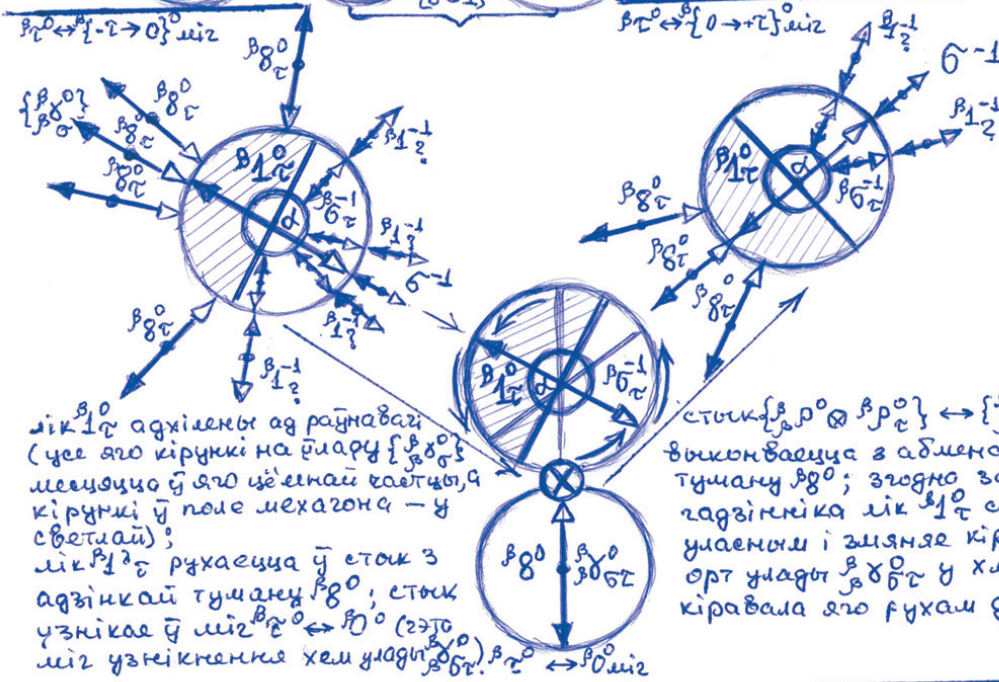
$\Lambda^0 | \beta \rho_c^0 : \beta \rho_c^0 \otimes \beta \rho_c^0 \rightarrow \beta \rho_{\beta c}^0 \rightarrow \mu \beta \rho_c^0$  - закони вандруйнай хмары ўлады ў схемах рэха ў полі  $\beta^0$

закон звяза  $\beta \{ \delta \otimes 1 \}^0$

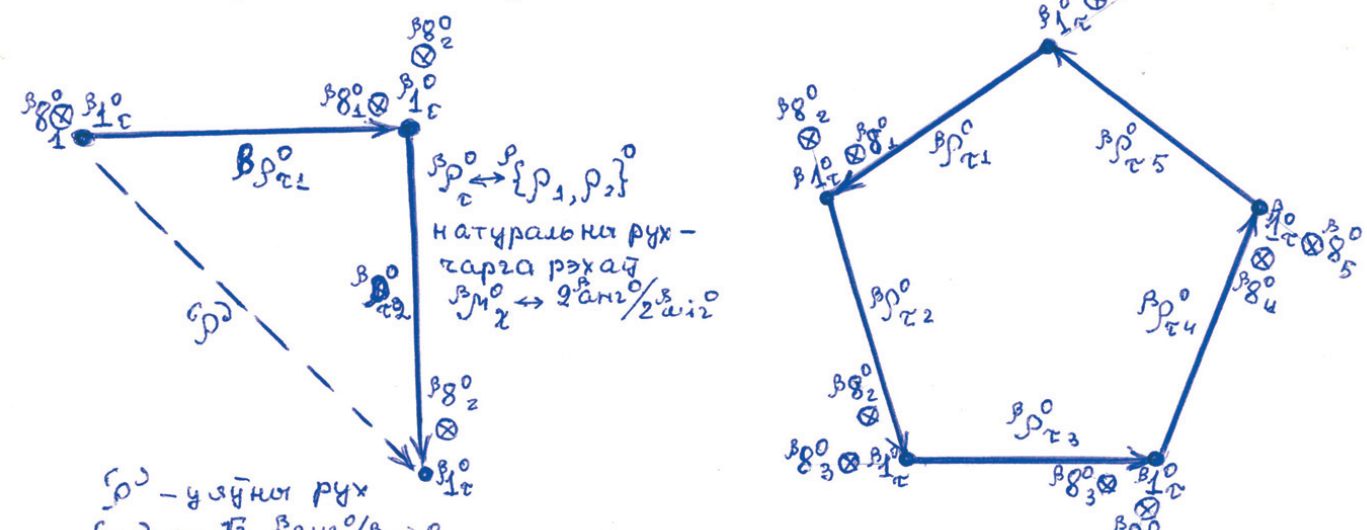


закон рэха адтуманя

у рэку ліка  $\beta 1_c^0$  ад адзінкі туману  $\beta \rho_c^0$  закоў ваячча малітуды кута да стыка і за стыкам.

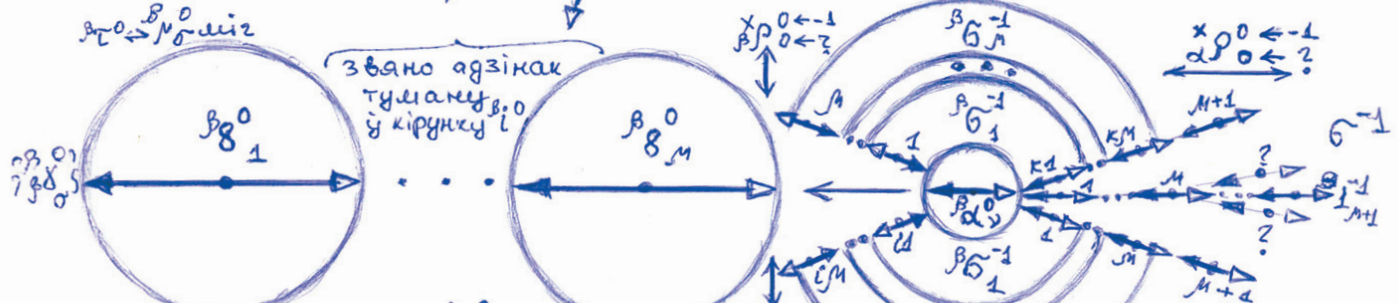
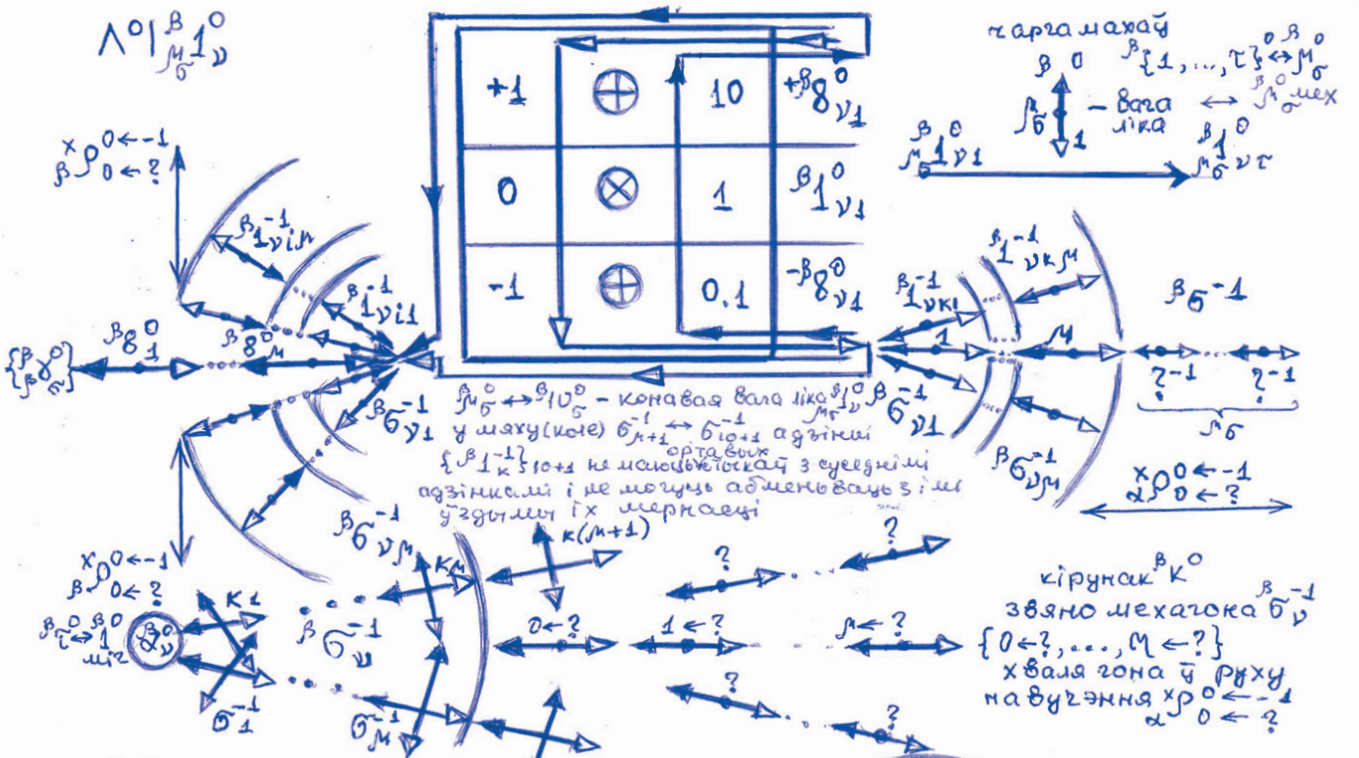
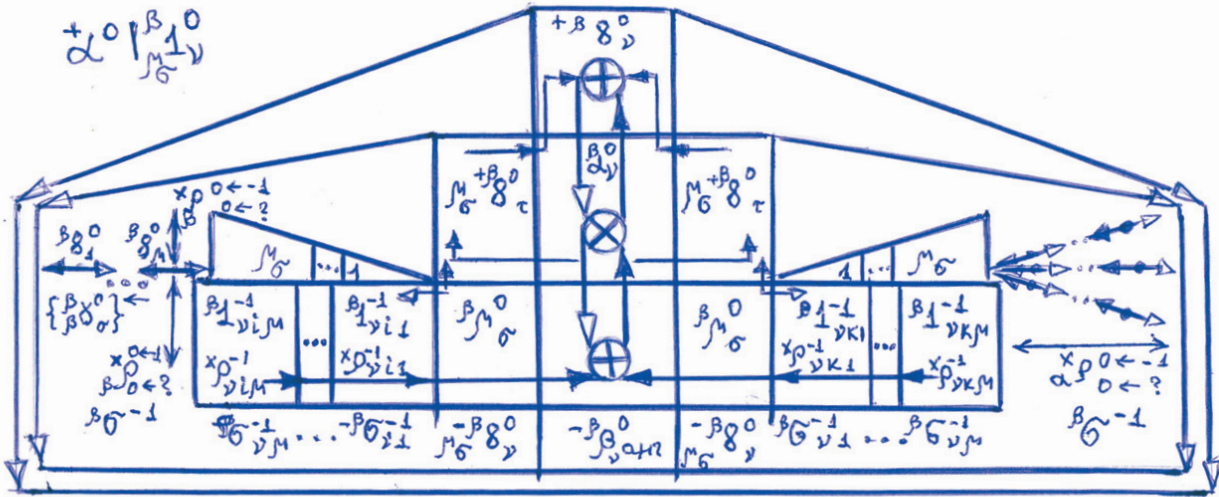


знана звязаў  $\beta \{ \delta \otimes 1 \}^0$  і у рэку ад хмары  $\{ \beta \rho_c^0 \}$



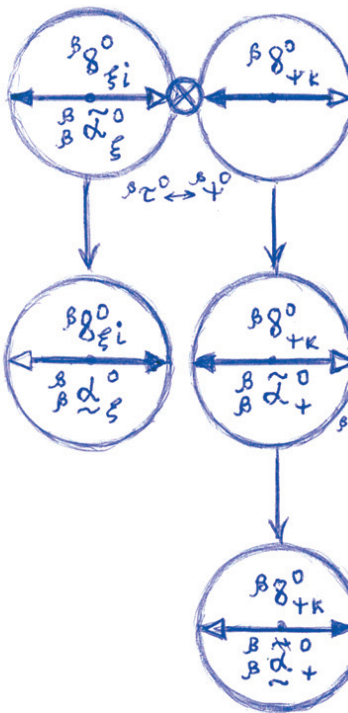
звяз  $\beta \rho_c^0 \otimes \beta 1_c^0$  можа знікнуць у выніку сігналу новай  $\beta$ -ўлады; згараны сігнал дзейнічае на лік  $\beta 1_c^0$  і ўзнікае новы звяз з новым кірункам руху. Гарза рухаў выконваецца некалькімі сігналамі ўлады. Улічны рух  $\beta \rho_c^0$  мае ўлічную хуткасць  $\beta \rho_c^0$  якая меней за натуральную.

$\Lambda^0 | \beta^0 \sigma^0$ :  $\beta^0 \sigma^0 \leftrightarrow \mu^0 \beta^0 \uparrow \downarrow \tau$  - рух важких лікай: зарга махау, вага лікай



цэжкі лік  $\beta^0 \sigma^0_1$  уключнае  $\mu^0 \beta^0$  каляц у мехагон  $\beta^0 \sigma^0 \leftrightarrow \{0, \dots, m\}$ , ( $\beta^0 \sigma^0$  - каляц адна); лік  $\beta^0 \sigma^0_m$  уключае ў мехагон звано  $\mu^0 \beta^0$  адзінак  $\{\beta^0 \sigma^0_1\}$  лікумага меранне  $\Lambda^{-1}$  кірунка  $\beta^0 \sigma^0$  выключна заргу мавад  $\mu^0 \beta^0$  у кірунку  $\beta^0 \sigma^0$  на ўлада ( $\beta^0 \sigma^0 \leftrightarrow 10^0$ ) адзінак звано  $\{\beta^0 \sigma^0_1, \dots, \beta^0 \sigma^0_m\}$  адзінак тыману, а ўлада  $\beta^0 \sigma^0$  разам з мехагонам  $\beta^0 \sigma^0$  спужавану ў посе мехагона  $\beta^0 \sigma^0$  на  $\mu^0 \beta^0$  анг за  $\mu^0 \beta^0$  мідэ. Зарга махау - вага лікай. Вага  $\beta^0 \sigma^0 < 1$  ліка  $\beta^0 \sigma^0_1$  у роўнац  $\beta^0 \sigma^0 < 1$  ліка  $\beta^0 \sigma^0_1$  з адным каляц у мехагоне і валай  $\beta^0 \sigma^0$ .

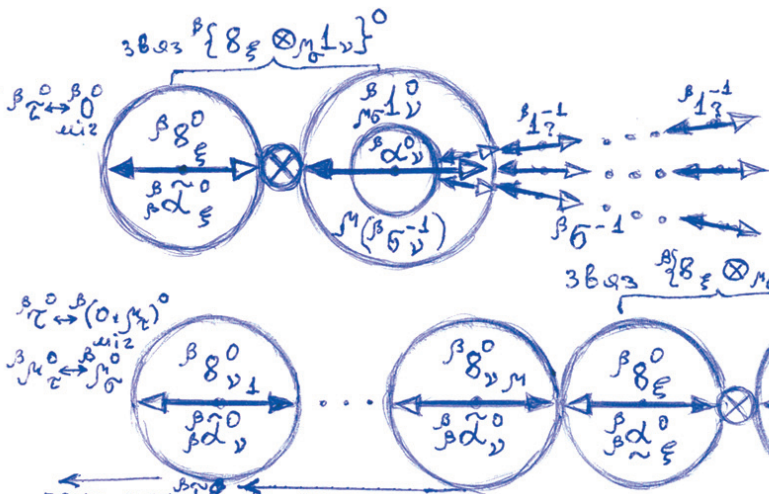
$\Lambda^0 \beta \rho_0^0$ :  $x \tilde{\rho}^0 \rightarrow 1$  - зон руху набування звукової прапанови  $\beta \tilde{\alpha}^0$  у полі туману  $\beta \delta^0$ ,  
 $\beta \rho_0^0 \{ x \tilde{\rho}^0 \rightarrow 1 \}$  - звукове рэха ў полі  $\beta \tilde{\alpha}^0$ , узмацненне звука цяжкімі лікамі  
 $x \tilde{\rho}^0 \rightarrow 1$  - вандруючая прапанова ўлады ў тумане  $\beta \delta^0$



адзінка туману  $\beta \delta^0$ ; лік  $\beta 1^0$  уключае прапанову  $\beta \alpha^0$  звуковай хімернай улады атрыманую (згодна з законам іерархічнага гадзінніка) з помачці  $\beta \rho^0$  у адказ на сігнал практыкі  $\beta \delta^0$  ( $\beta \delta^0$  - гукавы ортады які ўзнік у аб'ёмнае кутаў адзінкі туману  $\beta \delta^0 \rightarrow \beta \rho^0$ ; з яе навакольным светам  $\beta \rho^0 \rightarrow \beta \delta^0$ ); прапанова  $\beta \rho^0$  рухаецца ў месца стэка з полем туману  $\beta \delta^0$  светлым каніюм яе маха (як улада); калі яна выконвае акты ўлады (мнотанне рукам асветы на некалькі адзінак з поля  $\beta \rho^0$ ; і складання вонкава) яна мусіць працаваць з навакольным светам  $\beta \rho^0$  як з механічным слухам  $\beta \rho^0$

сістэма  $\beta \alpha^0$  выконвае толькі адзін акт мнотанне - з адзінкай  $\beta \rho^0$  туману лік  $\beta 1^0$ ; яе прапановы пад змяняецца на знікаючы і  $\beta \alpha^0$  знікае ў памяці  $\beta \rho^0$ ; але адзінка  $\beta \rho^0$ , якая атрымала сігнал  $\beta \alpha^0$ , мусіць упер выконваць акты ўлады ў яе навакольным свеце  $\beta \rho^0$  як у механічным слухе - з таі жа вынікам як у адзінкі  $\beta \rho^0$  - яе прапанова знікае ў яе памяці  $\beta \rho^0$ ; але яна спынаецца і ў адзінцы  $\beta \rho^0$ ; такім чынам гук  $\beta \alpha^0$  рухаецца ў полі туману  $\beta \delta^0$  - вандруе ў зоне руху набування ў полі  $\beta \tilde{\alpha}^0$ .

$\{ x \tilde{\rho}^0 \rightarrow 1 \} \otimes \beta 1^0 \leftrightarrow \beta \rho_0^0 \{ x \tilde{\rho}^0 \rightarrow 1 \}$  - звуковае рэха ў полі  $\beta \tilde{\alpha}^0$ .



адзінка туману  $\beta \delta^0$  з вандруючай прапановай звуковай улада  $\beta \alpha^0$  рукам асветы (светлым каніюм маха) мнотанне на цяжкі лік  $\beta 1^0$  (лік  $\beta 1^0$  уключае  $\beta \rho^0$  колай ч механічным слухе  $\beta \rho^0$ ); у гэтым мнотанні ўзнікае звезда  $\beta \delta^0 \otimes \beta 1^0$ ;

якая абмяжоўвае яго цяг  $\beta 1^0$  у месцы стэка і  $\beta \rho^0$ ; цяжкі лік  $\beta 1^0$  змяняе кірунак руху (яго хімернай уладай апынаецца  $\beta \alpha^0$ ); ў кірунку на  $\beta \alpha^0$  узнікае звяна  $\{ \beta \delta^0, \dots, \beta \rho^0 \}$  адзінак туману; згодна закону звяна  $\{ \beta \delta^0 \otimes \beta 1^0 \}$ ; усе адзінкі туману ўзнікаюць за межамі звяна  $\beta \delta^0 \otimes \beta 1^0$ ; і сёбваюць гэты звяна ў поле мех алока  $\beta 1^0$  на  $\beta \rho^0$  ант за  $\beta \rho^0$  міг; адзінка  $\beta \rho^0$  здымае прапанову ўлады (з-за неагдымаецці выконваць адразу некалькі актаў мнотанне і складання ў мех алока) і  $\beta \alpha^0$  знікае ў памяці  $\beta \rho^0$ ; але ўсе адзінкі звяна  $\{ \beta \delta^0, \dots, \beta \rho^0 \}$  у працэсе іх узнікнення мнотанна на прапанову  $\beta \alpha^0$  і яна выконваецца ў месцы усе адзінак звяна (са зменай яе кірунка - зараз яна рухаецца нібы ае крыніца - лік  $\beta 1^0$ , як рэха лікумага руху); Усе мусіць звяна туману з прапановай улады (звэна узможнае руху) рухаюцца свабодна і могуць зноў мнотанне іх гук на новыя цяжкі лік, гук) рухаюцца разе ўзмацняюцца зноў і зноў змяняе кірунак руху. Гук-улада руху, гук змяняе цяг  $\beta 1^0$  з лікумага на цяг  $\beta 1^0$  у новы свет - у месцы св асветы лікаў іх мех алокамі (практыкай і памяццю)

абмен імакун механікамі  
справа чыгата

$\alpha^\lambda |_{\alpha, \beta \{ \rho_0 \leftarrow \{ \} \} } \tau$  - вандроўны лад у зоне навузэння ў рэха ў  $A^{\lambda\sigma}$

$\lambda \leftrightarrow \lambda$ ,  $\omega_2^\lambda \leftrightarrow \omega^\lambda$

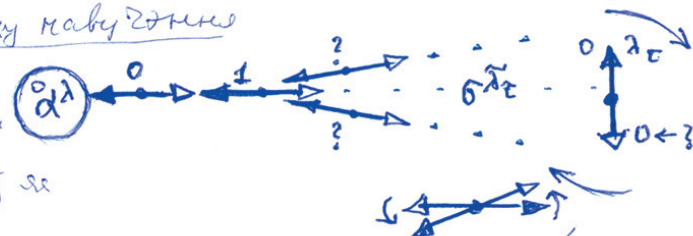
$x_{\rho} \lambda \leftarrow \lambda_2$   
 $\alpha \leftarrow \{ \} \{ \}$



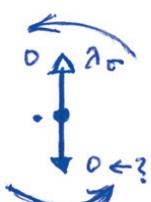
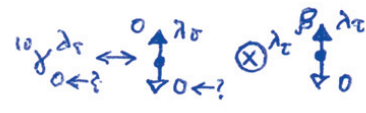
сістэмы  $\{ \omega_2^{\lambda\sigma} \}$  імкнуча у месца  $\beta^{\lambda\sigma}$  вызваленае ў свечы  $A^{\lambda\sigma}$  сістэмай  $\beta^{\lambda\sigma} \leftarrow \omega_0^{\lambda\sigma} \leftarrow \lambda_2$ ,  
калі яна ўключылася у механізм  $\beta^{\lambda\sigma}$  з нумарам  $0^{\lambda\sigma}$ ; (свет  $A^{\lambda\sigma}$  мінулы ў свечы  $A^{\lambda\sigma}$ ,  
сістэмы  $\{ \omega_2^{\lambda\sigma} \}$  - адзінкі гледзі ў  $A^{\lambda\sigma}$  і мусяць уключыць  $\beta^{\lambda\sigma}$  у іх механізм);  
месца  $\beta^{\lambda\sigma}$  займае сістэма  $\omega_0^{\lambda\sigma}$ , яна мае сток з  $\beta^{\lambda\sigma}$  і нумар  $1^{\lambda\sigma}$  у  
зоне  $x_{\rho} \lambda \leftarrow \lambda_2$ ; дзякуючы стыку з  $\beta^{\lambda\sigma}$ , сістэма  $\beta^{\lambda\sigma}$  мае сток і з  $\alpha$ ,  
памуючы лад  $\alpha^\lambda$  унікае ў  $\beta^{\lambda\sigma}$  і надзяляе сістэму  $\beta^{\lambda\sigma}$  звольнаецю чыгата;  
навакольныя сістэмы  $\{ \omega_2^{\lambda\sigma} \}$  цягнуцца за  $\omega_0^{\lambda\sigma}$ ; гэты рух узнікае поле  $A^{\lambda\sigma}$   
калі  $\alpha^\lambda$  і дае магчымаць актывізаваць новыя зоны руху навузэння ў  $A^{\lambda\sigma}$ .

з чыгатам лад у гэтых зонах паводзіць механізм і ўзнікае індукцыя  
чыгата іх лад  
закон зонаў руху навузэння

рух у сістэмах  $\{ \omega_2^{\lambda\sigma} \}$   
узнікае чыгатам  
іх механізм  
агонію  $\beta^{\lambda\sigma} - 1$  у  
стагнацы

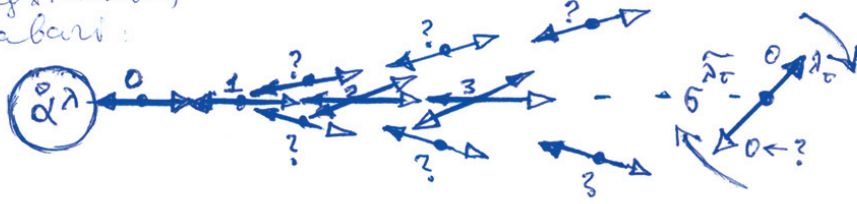


правы  
схема  
закон чыгата  
(у месцах  
закон  
іерархічнае  
падзяленне)



іх механізм імакун чыгата хвалі -  
звонкі

схемат зонаў  
у руху архімейцы  
ад рад навалі;  
навакольны  
калі



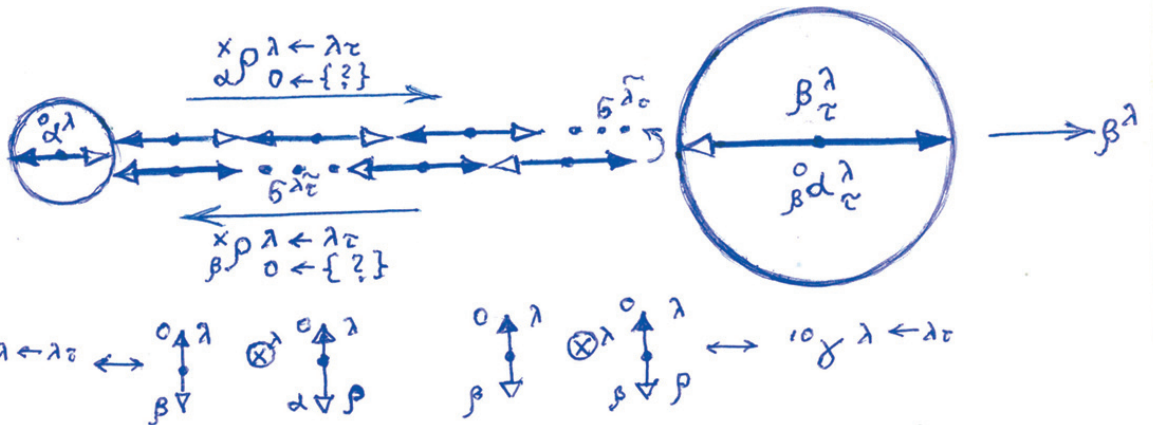
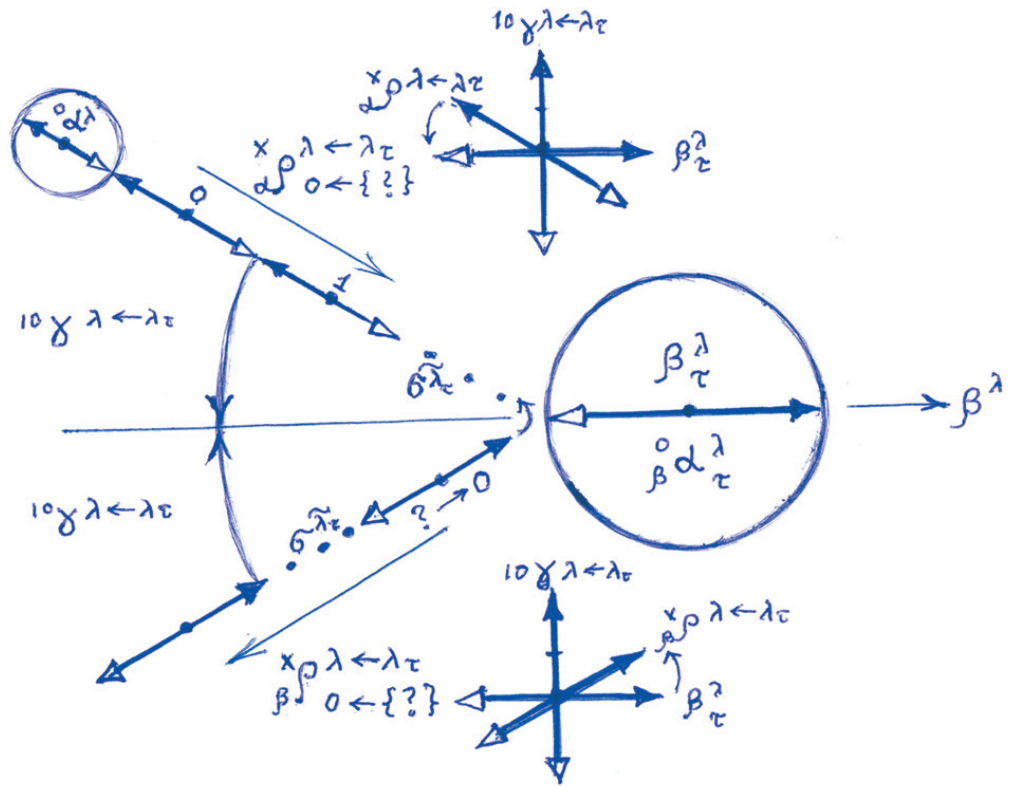
Кірункі махакун сістэм  $\omega_0^{\lambda\sigma}$  мусяць узгадняцца з кірункам зона  $x_{\rho} \lambda \leftarrow \lambda_2$ ;  
працэс узгаднення актывізуецца светлым канцом  $\omega_0^{\lambda\sigma}$ ; гэты какез - уладу  
поля  $\beta^{\lambda\sigma}$  і ён верыцца да  $\beta^{\lambda\sigma}$ , а далей - да узгаднення з кірункам зона;  
рухі наваротаў уздымаюць мернаецю  $\omega_0^{\lambda\sigma}$ , у ім узнікае новыя орты  $\omega_0^{\lambda\sigma}$ .

Зоны руху навузэння (унікае ў гледзі  $\alpha^\lambda$ ) закупаюць іх крынічныя кірункі,  
месца сістэм  $\omega_0^{\lambda\sigma}$  можна змякчыць, а гон накіраваны на яе мінулае месца.  
Лініі зонаў могуць знікаць, але вандроўны лад (хвала звонкі сістэм  $\{ \omega_2^{\lambda\sigma} \}$ )  
рухаецца ў полі  $A^{\lambda\sigma}$  далей.

арбіталі, іх механізм  
рух і рэха імакун  
механізм, абмен  
механізмамі, змена чыгата

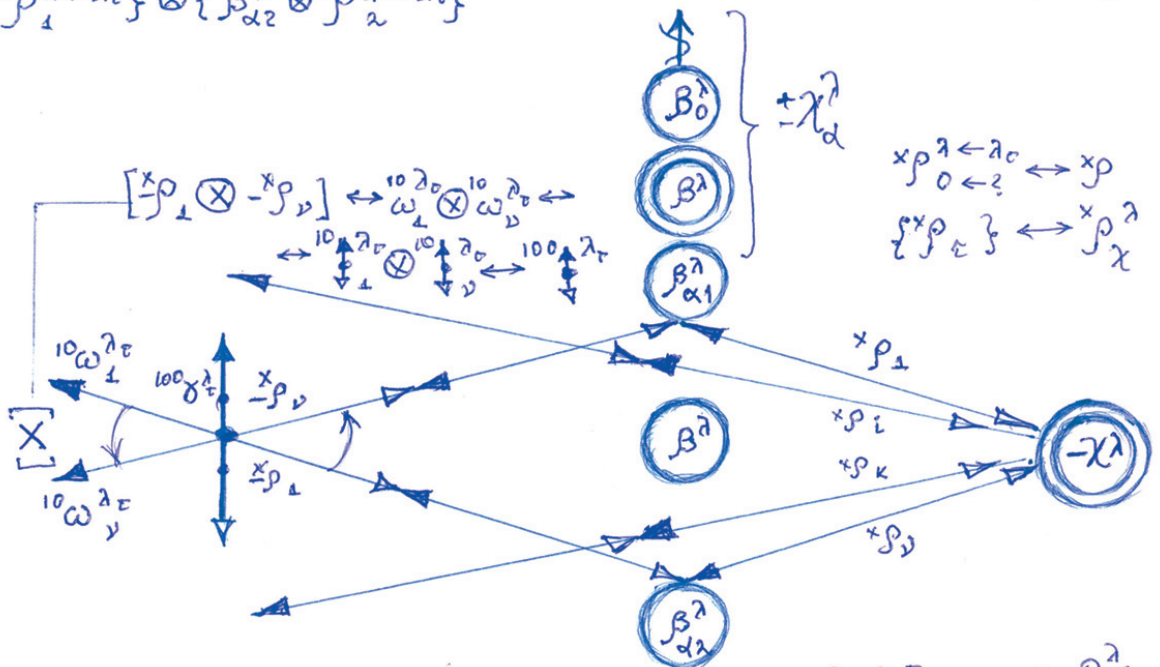


$\alpha^\lambda | \alpha, \beta \{ \rho_0 \leftarrow \{??\} \} \tau$   
 $\lambda \leftrightarrow \lambda, \omega_\tau^\lambda \leftrightarrow \omega^\lambda$



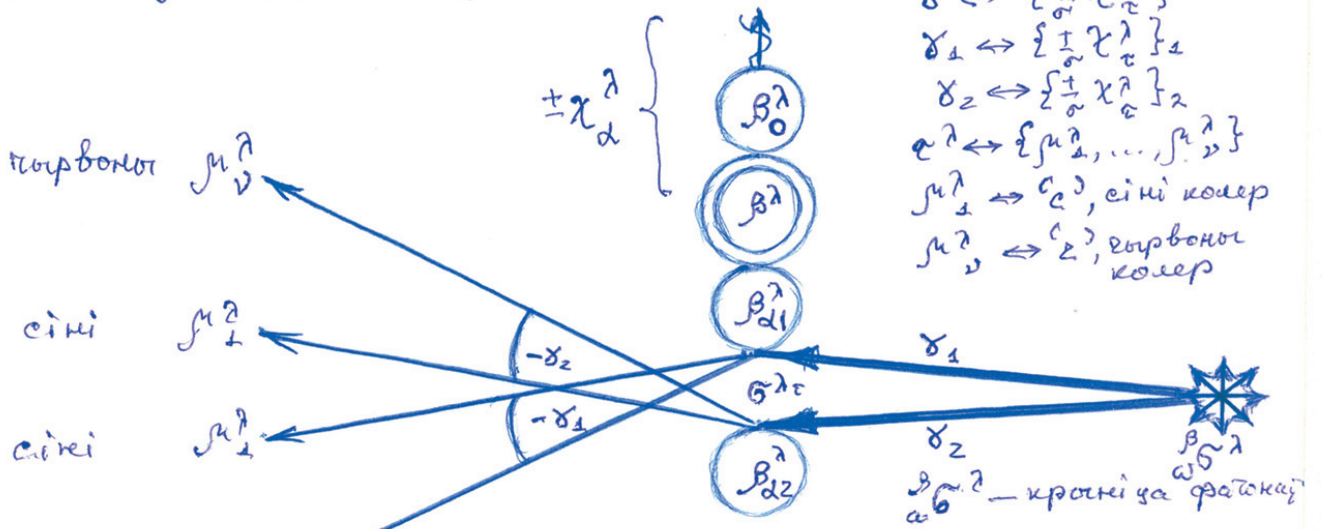
Руха (beta-зон)  $x \rho \lambda \leftarrow \lambda \tau \leftrightarrow \beta \rho_0 \leftarrow \{??\} \tau$  зона набування  $\alpha \rho_0 \leftarrow \{??\} \tau$  (alpha-зона) узника у  
 стьку alpha-зона з адзінкай туману  $\beta^\lambda$ . Адзінка  $\beta^\lambda$  - хімічная ўлада  $\beta^\lambda$  і  
 татальная ўлада  $\beta^\lambda$  (вынік множання сістэмы  $\alpha^\lambda$  - татальнай ўлады  $\beta^\lambda$ ). Як  
 таго адзінка  $\beta^\lambda \leftrightarrow \beta^\alpha \tau$  мерае лічунна сістэмы (у том ліку іх вагу) і размяшчае  
 месцы ў  $A^\lambda$ .  
 Вага (вугал)  $10 \gamma \lambda \leftarrow \lambda \tau$  alpha-зона узнікае ў яго стьку з beta-адзінкай. У зоне  $\beta^\lambda$  з  
 валою alpha-зона (зоне, вызваленай адзінкай  $\omega_\tau^\lambda$  з alpha-зона) аптымаецца адзінка з  
 beta-зона  $\omega_\tau^\lambda$  зона вага ч мерках beta-ўлады (вугал з beta-ўладай) ураўнаважвае  
 зон набування (alpha-зон).  
 Згін зона  $\alpha$  і  $\beta$  ціска на beta-адзінку  $\beta^\lambda$  і актывізуе зе рых у поле  
 іерархічна туману  $\beta^\lambda$ : у месцы згінна сьвязваюцца сістэмы  $\{ \omega_\tau^\lambda \}$ ;  
 beta-адзінка ссуб'юаецца, яе мэта-контатт з туманам  $\beta^\lambda$  як сьвязваюцца ў  
 зоне вольнай ад сістэмы поля  $A^\lambda$ .  
 Рух адзінкай туману з поле меканічна у поле  $\beta^\lambda$  - з-за  
 стькай з меканічнай, узе вольнай меканічнай туману  
 з-за узгодна меканічнай адзінкай

$\{\beta_{\alpha}^{\lambda}\} \otimes \{\chi_{em}^{\lambda}\}$  - множини лік туманної укладу  $\bar{y}$  стіжок з  $\chi$  меронами,  $\chi_{em}^{\lambda} \leftrightarrow \chi_{\varepsilon}^{\lambda}$   
 $\{\beta_{\alpha 1}^{\lambda} \otimes \chi_{r_1}^{\lambda \leftarrow \lambda_1}\} \otimes \{\beta_{\alpha 2}^{\lambda} \otimes \chi_{r_2}^{\lambda \leftarrow \lambda_2}\}$



$\chi^{\lambda}$  - негатрон  $-\chi_{em}^{\lambda}$  які має значення адхільності ад раїнавалі  $\bar{y}$  або руху  $\rho_{\chi}^{\lambda}$ : яго точки набувають  $\{x_{r_2}\} \leftrightarrow x_{r_1}^{\lambda}$  зоконваюча арїтї за аднїм у бїзїкїх кїрунках,  $\rho_{\chi}$  і зонаї, атрїтанїе  $\bar{y}$  кантїктах з арїтїкївалї туманної укладу  $\{\beta_{\alpha}\}$ , маючї стїк, у якїм уздїтїаєчїа зєркаєчїо.

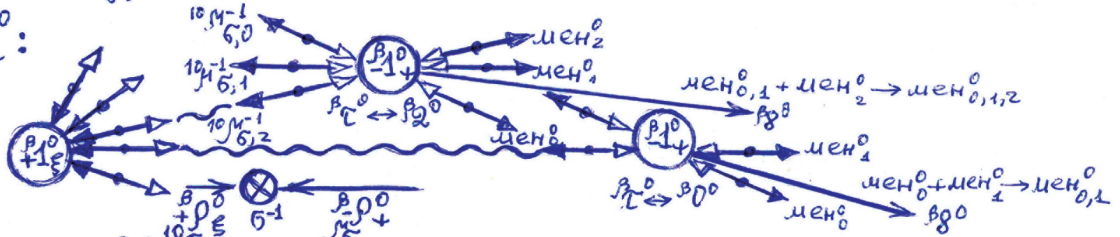
$$\{\beta_{\alpha}^{\lambda}\} \otimes \{\pm \chi_{em}^{\lambda}\} \leftrightarrow \{\beta_{\alpha}^{\lambda}\} \otimes \chi$$



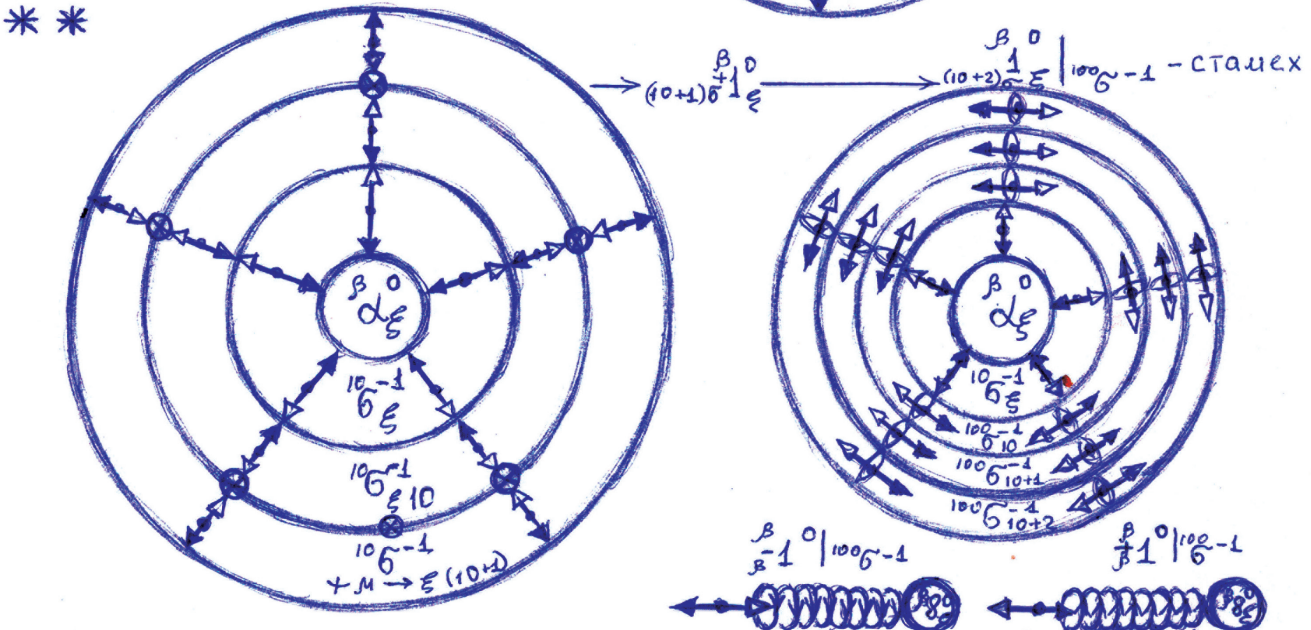
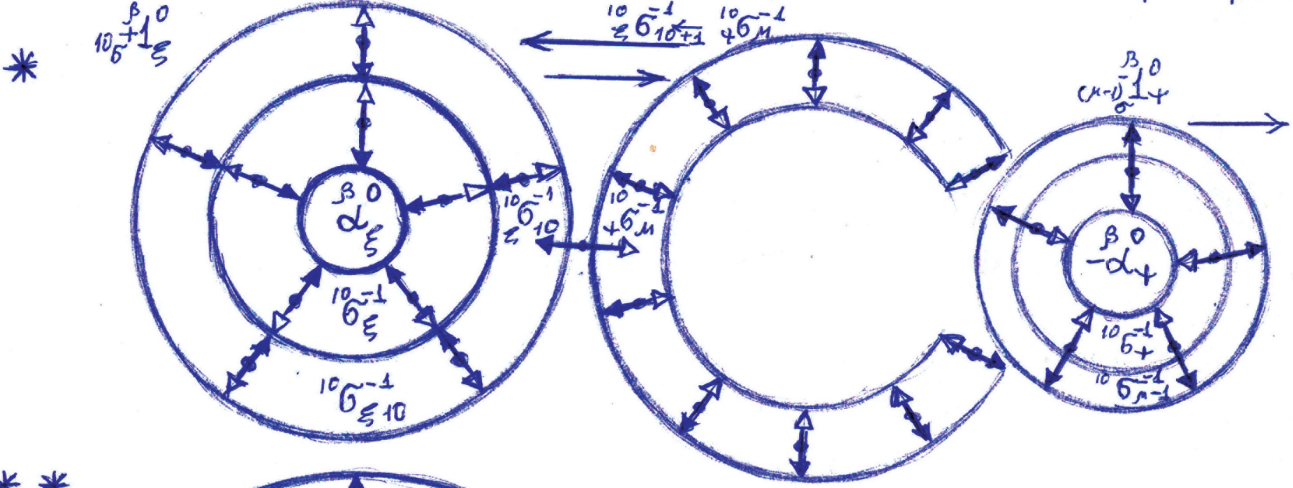
Арїтїкї туманної укладу  $\{\beta_{\alpha}^{\lambda}\}$  (атрїтанїе рухїа фїтїонїа  $\pm \chi^{\lambda}$ ) маючї стїкї з прїаєкївалї  $\{\chi\}$  якїя  $\bar{y}$  кїоєаючїа цєю гїлїу колєрїаї (бїлає свїтїло). Згадїанїи стїкї вїкїонїаючїа ант арїватїтїєт сїєзвїанїє: прїаєкївалї  $\chi$   $\bar{y}$  кїоєає чїєє колєрїаї якїя рухїаєчїа  $\bar{y}$  аднїмї кїрунїку, а стїк  $\beta_{\alpha}^{\lambda} \otimes \chi$  мєрїає валїу колєрїаї; зїїмає їх на вїдїмї згїоднїа їх вїзїє. Зїїрка б'д'є у пїлї  $\{\beta_{\alpha}^{\lambda}\}$  має вїд кїаєрїовїх колєрїаї: сітїкї крїз атїоєанїї вїлїєнїи колєрїаї, а на шїєтїї - жїєтїає колєрїаї і кїрївоєає.

$\Lambda^0 \beta \rho_6^0: \{ \beta_{10}^0 \downarrow \xi \otimes \beta_{6-1}^0 \downarrow \rho_6^0 \} \rightarrow \{ (10+1)_6^0 \downarrow \xi | 100\beta^{-1}, (M-1)_6^0 \downarrow \rho_6^0 \} -$  адзін мяхоў натуральнага і рэхавага лікаў, стамех

$\beta_{10}^0 \downarrow \xi \otimes \beta_{6-1}^0 \downarrow \rho_6^0:$



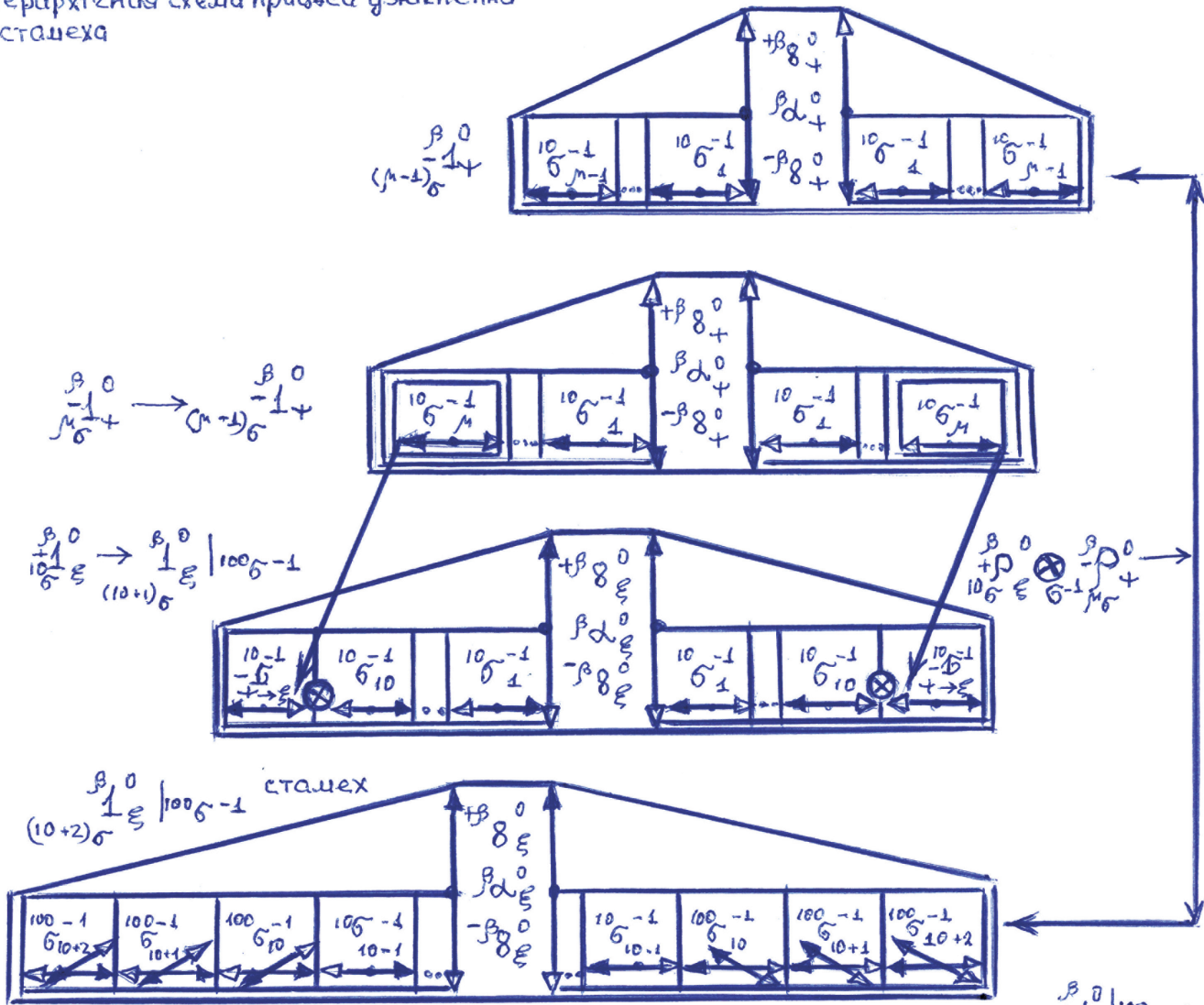
рэхавы лік  $\beta_{6-1}^0$  з вагой  $\beta_{10}^0$  мяхоў ( $\beta_{10}^0 \leftrightarrow \beta_{10-k}^0$ ) рыхаецца яго месцамі у ады да натуральнага ліка  $\beta_{10}^0 \downarrow \xi$  з вагой  $\beta_{10}^0$  мяхоў; мех (ска)  $10\beta_{10}^0$  ліка  $\beta_{6-1}^0$  уключна лікі  $\{10-k\}$  метана  $\lambda \leftrightarrow -1$ ; яго мернаець  $\beta_{6-1}^0 \rightarrow 100\beta^{-1}$ ; звенні  $\{10\beta_{6-1}^0, 0; 10\beta_{6-1}^0, 1; 10\beta_{6-1}^0, 2\}$  - куэт поля  $\beta^{-1}$  які ўключнаецца ў мехатон рэхавага ліка ў яго руху, гэты куэт займае ў  $10\beta_{6-1}^0$  кавалкі (соткі, куты); соткі складваюцца ў палігон (кут) руху ў мехатон  $\beta_{6-1}^0$ ; куэт  $\beta_{6-1}^0$  мен<sub>0</sub>, мен<sub>1</sub>, мен<sub>2</sub> - змены руху ў кірунку лёт  $\beta_{10}^0$ , яны складваюцца па законе паралелаграма.



\* натуральны лік сцягвае адзін  $10\text{мех}_{10}^{-1}$  з рэхавага ліка; рэхавы лік  $\beta_{10}^0$  змяняе кірунак руху; скрутка  $\beta_{10}^0$  змяняе кірунак руху;

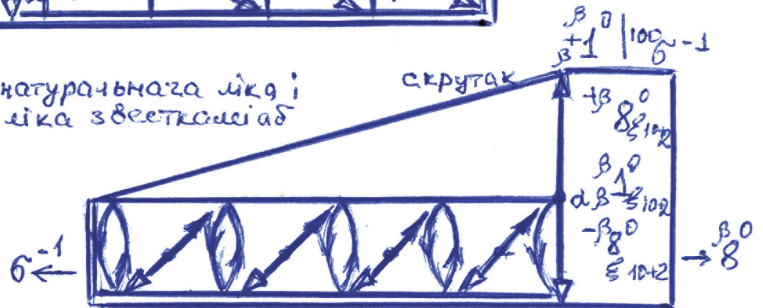
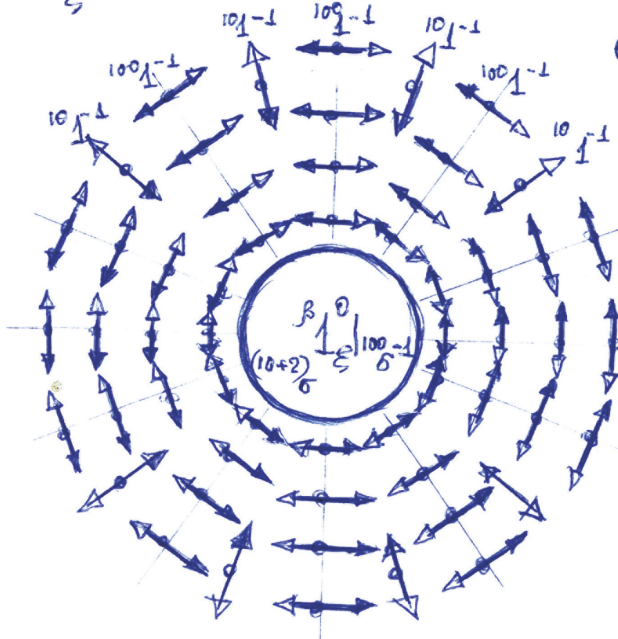
\* адзінкі  $\{10-k\}$  натуральнага ліка мятацца на адзінкі сцягнутага мяха і ўзнікаюць орты мернаець  $\beta^{-1} \leftrightarrow 100\beta^{-1}$  (згодна законам пан-ліка  $\Lambda^0$  уключаным у метана  $\lambda \leftrightarrow -1$ ); сцягнуты мех і ўласны 10-ты мех ліка  $\beta_{10}^0$  (які зараз уключае  $(10+1)$  мяхоў у  $\beta_{6-1}^0$ ) змяняюць мернаець;  $(10+1)_6^0$  узакуюць разгортванню атрыманых ортаў у новых кірунках выніковы мех і такей зрэйкіцы; лік з мяхамі мернаець  $\beta^{-1} \leftrightarrow 100\beta^{-1}$  (стамех) можа ўключнаць 2 мяхі за конам магчымасці натуральнага ліка  $10\beta_{10}^0$ ; вага ліка-стамеха рэўная  $\beta_{10}^0$  мяхоў; стамехі - каэвоны лікі і з цогам вагу вортаюцца ў мінулы (натуральны) ад; 100-мерныя мехі ў гэтым працэсе могуць апсанацца скруткамі  $\beta_{10}^0$ ; хімеронны стамехамі з  $\beta$ -ўсадай (іх уада адзінка туману  $\beta_{10}^0$  мейыца ў канцы скрутка маіравацымі ў поле  $\beta$ ); скрутка рыхаецца ў адным кірунку з конавай хуткасцю  $\beta_{10}^0$  ам/  $\beta_{10}^0$  м/с і шалоцо розныя стінкі.

ієрархічная схема працэса ўзнікнення сталеха



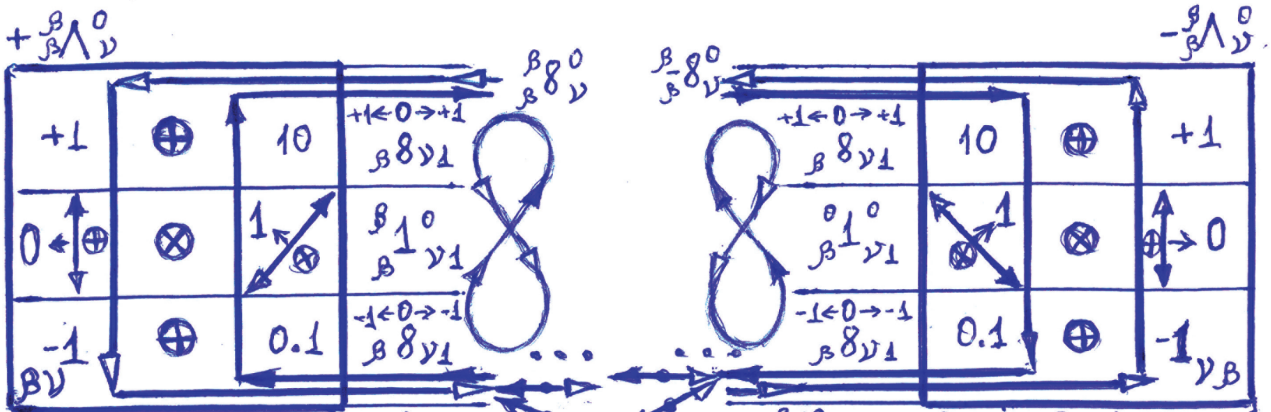
скрутак працуе як шмэрэн-сталех натуральнага ліка і ўздымае мернаець пашыці такога ліка з вэеткам і аб кантактах сталеха

$100\sigma^{-1}$   
 $\xi$  - поле сталеха



улада  $\beta^0$  сталеха  $\beta^0$  заеаецца ўладай натуральнага ліка і замінае мяхам  $100\{\beta_{10}, \beta_{10+1}, \beta_{10+2}\}$  змяняць мернаець мяхоў  $10\{\beta_1, \dots, \beta_{10-1}\}^{-1}$  з  $\beta^{-1} \leftrightarrow 10^{-1}$  на  $\beta^{-1} \leftrightarrow 100^{-1}$ ; але навакольнае поле  $\beta^{-1}$  сталеха  $\beta^0$  змяняе мернаець з  $\beta^{-1} \leftrightarrow 10^{-1}$  на  $\beta^{-1} \leftrightarrow 100^{-1}$  узгодна зонам руху наўздымна ад арзіналі  $\{100\sigma^{-1}\} \xi$  мяха  $100\sigma^{-1}$  які мае кантакт з гэтым пашыці  $\xi(10+2)$  у вэетку сталеха  $\beta^0$ , асуджаны паказ  $100\sigma^{-1}$ , еста ў значнай мэрці і мэрці у дадзеным да натуральнага і рэхабова лікаў (яны ствараюць у іх мехалогот адзімакі мернаеці  $\beta^{-1} \leftrightarrow 10^{-1}$ ); сталех мае магчымасць ствараць у яго мехалогот і адзімакі мернаеці  $\beta^{-1} \leftrightarrow 10^{-1}$  але ў асноўным яго поле мае мернаець  $\beta^2 \leftrightarrow 10^2$ .

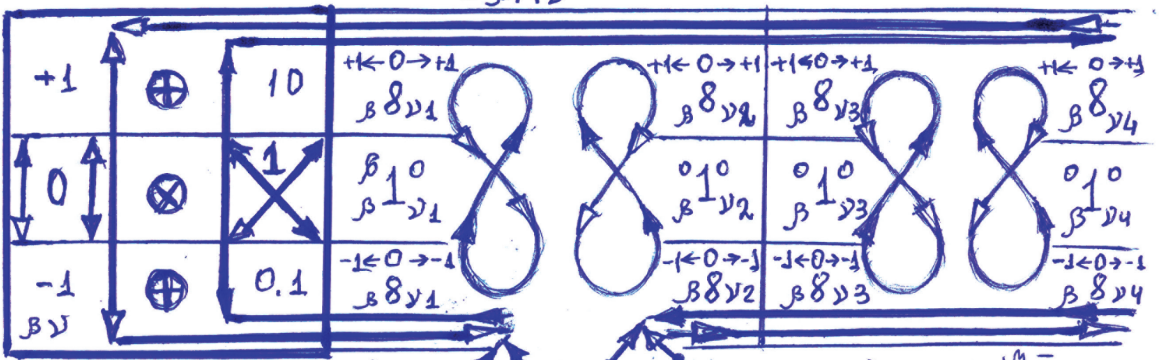
$\{+\beta 1^0, -\beta 1^0, \pm\beta 1^0\}$  - лікавня хімерони



$\uparrow +\beta 1^0$  - натуральны лікавы хімерон  
 $+ \beta \{+1 \oplus -1\}^0 \rightarrow +\beta 0^0$   
 $+ \beta \{10 \otimes 0.1\}^0 \rightarrow +\beta 1^0$

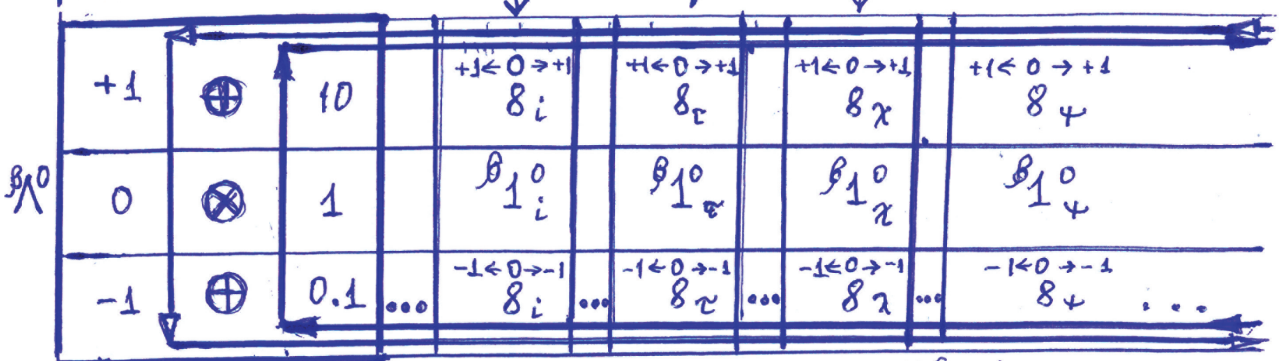
$\downarrow -\beta 1^0$  - рэхаваы лікавы хімерон  
 $- \beta \{+1 \oplus -1\}^0 \leftrightarrow -\beta 0^0$   
 $- \beta \{10 \otimes 0.1\}^0 \leftrightarrow -\beta 1^0$

$\pm\beta \Lambda^0$



$\pm\beta 1^0$  - сцязавы лікавы хімерон

нумар  $y$  ўключанаў колькасць рэхаў мекхагона - колер хімерона



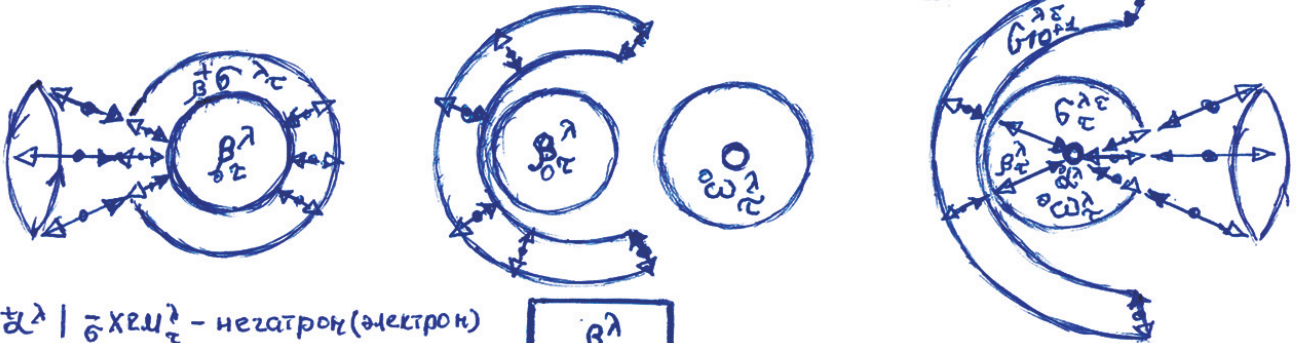
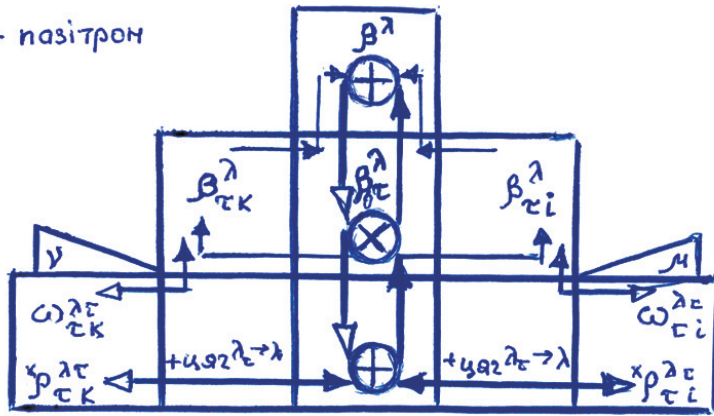
лікі  $\beta \Lambda^0$  зонаў  $\beta \Lambda^0$  могуць надзяляць іх адзінкі тыману  $\delta_i^0$  мекхагеноты агонамі. Атрыманая адзінка (хімерон) працуе як зоніт  $\beta \Lambda^0$ :

- $+\beta \Lambda^0$  - нат-л-хем - натуральнае імітацыя мекхагона  $\beta \Lambda^0$  (эго кроніца - лік  $1^0_i$ )
- $-\beta \Lambda^0$  - рэхавае імітацыя мекхагона  $\beta \Lambda^0$  (эго кроніца - лік  $1^0_x$ )
- $+\beta \Lambda^0$  - сцяз-л-хем - мае кроніцай лік  $1^0_r$  зона  $\beta \Lambda^0$  (сцязавы лікавы хімерон  $\pm\beta 1^0$  мае ўласнае рэха - хімерон  $\beta \{+r, -r\}^0$  дзе гарга рухаў  $\beta \{r, +r\}^0$  рэхавае да сямойнай гары  $\beta \{+r, -r\}^0$ )

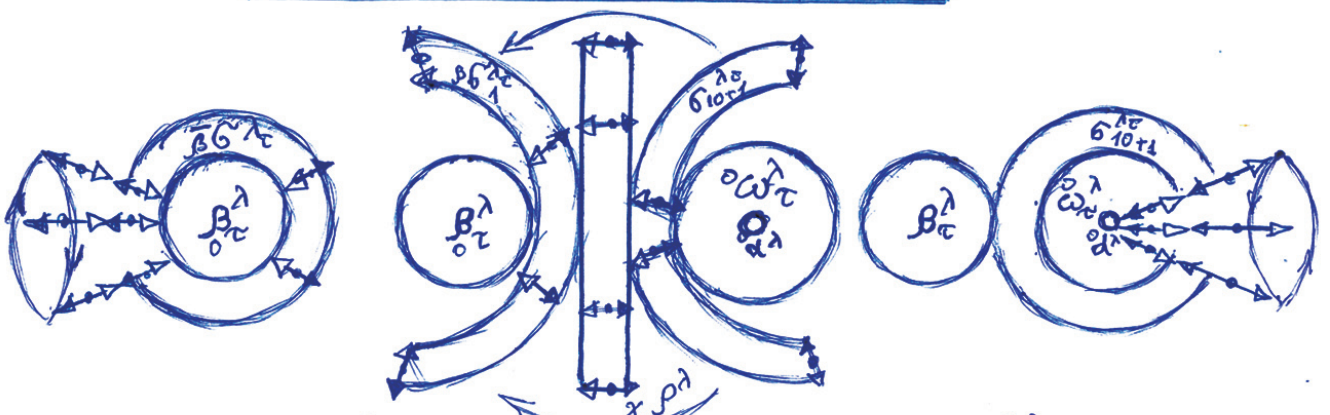
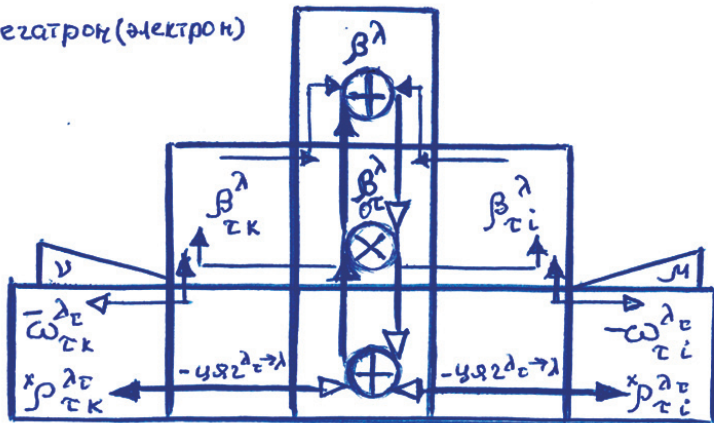
Хімероны  $\beta \Lambda^0$  могуць вывадзіць уласныя хімероны, у такім разе іерархічны нумар  $y$  ўключанае нумар ліка ( $i, r, x, \dots$ ) з якога ідзе хімерон-кроніца; нумар ліка  $y$  кронічны хімероне, з якога ідзе новы хімерон (а ён можа вывадзіць уласныя хімероны). Гэта дае магчымасць значна павялічыць хуткасць працэсаў навузэнна ў лікуных мексанях  $\Lambda^0$  і  $\Lambda^0$  дзе хімероны працуюць як лікавыя працэсары сістэмы ўладу.

Хімероны маюць уласныя хем-агоніт  $\beta \delta^0$  і ўласную паміць  $\beta \delta^0$ , які ўключанаўца ў хем-агоніт іх кроніца і ў іх паміць з сімвалам  $\beta$  - паміць  $\beta$  везваецца з  $\alpha$  - паміць лікаў - кроніца.

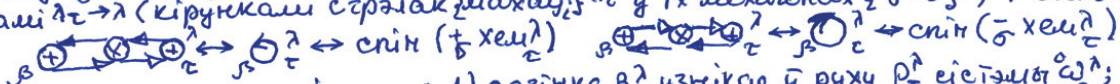
$\alpha^{\lambda} | \frac{1}{6} \chi_{em}^{\lambda} - \text{позитрон}$   
 $\lambda \leftrightarrow \lambda$



$\alpha^{\lambda} | \frac{1}{6} \chi_{em}^{\lambda} - \text{негатрон (электрон)}$   
 $\lambda \leftrightarrow \lambda$



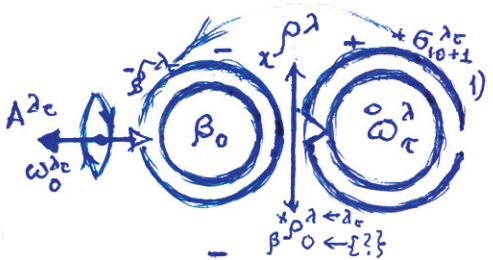
Схеми  $\alpha^{\lambda} | \frac{1}{6} \chi_{em}^{\lambda}$ ;  $\alpha^{\lambda} | \frac{1}{6} \chi_{em}^{\lambda}$  позитрона і електрона, у адрозненні ад  $\alpha^{\lambda}$ -схеми протона, мають адрітку туману  $\beta^{\lambda}$  на межі ядра  $\alpha^{\lambda}$ . Згадані схеми адрозніваються одна від одної цягами  $\lambda \rightarrow \lambda$  (кірунками стрілок {махаю}; до у їх мехалонах {б^{\lambda} \omega^{\lambda}}) і спінами:



працює узникнення позитрона: 1) адрітка  $\beta^{\lambda}$  узнімає у руху  $\rho^{\lambda}$  електронів  $\omega^{\lambda}$ ; 2) адрітка  $\beta^{\lambda}$  рухається у поле туману  $\beta^{\lambda}$ ; 3) кола  $\beta^{\lambda} \omega^{\lambda}$  мехалона електронів  $\omega^{\lambda}$ ; 4) кола  $\beta^{\lambda} \omega^{\lambda}$  ахитває мехалонам  $\beta^{\lambda} \omega^{\lambda}$  електронів  $\frac{1}{6} \chi_{em}^{\lambda}$  — позитрона;  
 працює узникнення негатрона: 1) адрітка  $\beta^{\lambda}$  яма узнімає у руху  $\rho^{\lambda}$  протона  $\omega^{\lambda}$ , лінає усе кола мехалона  $\beta^{\lambda} \omega^{\lambda}$  електронів  $\omega^{\lambda}$  і рухається у поле туману  $\beta^{\lambda}$ ; 2) у гэты час кола  $\beta^{\lambda} \omega^{\lambda}$  ахитває яе назад, у гэты ахце кола  $\beta^{\lambda} \omega^{\lambda}$  выдэржываючы на чырні дык; 3) узнімає негатрон (электрон) — рэхавае імітацыя протона  $\omega^{\lambda} \leftrightarrow \sigma^{\lambda} \chi^{\lambda}$ .

$d^{\lambda} | \pm \chi_{em}^{\lambda} - \text{фотон}$   
 $\lambda \leftrightarrow \lambda, \beta_{\pm}^{\lambda} \leftrightarrow \beta_0$

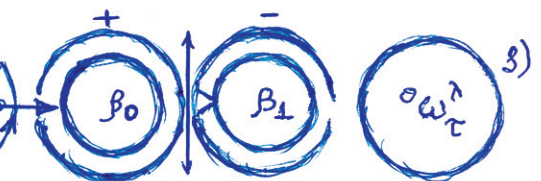
1) негатрон  $\bar{\nu} \chi_{em}^{\lambda}$  узнікае калі кола  $+b_{10+1}^{\lambda}$  сістэмы  $\omega_{\tau}^{\lambda}$  рухаюцца  $\chi^{\rho\lambda}$  ахутвае адзінку тунану  $\beta_0$  і апынаецца яе мехалонам  $-b_{\lambda\tau}$ ; знак  $>$  у атоме  $+b_{10+1}^{\lambda}$  - месца стыху з адзінкай  $\beta_0$ ; рух мюнтанна  $\chi^{\rho\lambda} \leftrightarrow \chi^{\rho\lambda} \leftarrow \lambda$ ;  $\beta_0 \oplus +b_{10+1}^{\lambda}$  (рэха  $\bar{y} A^{\lambda}$ ) вынікае выніканне  $+b_{10+1}^{\lambda}$ , у яго рэха  $-b_{\lambda\tau}$ ; негатрон уключае  $\bar{y} -b_{\lambda\tau}$  адку рэа  $\omega_{\tau}^{\lambda}$  поля эфіру  $A^{\lambda}$ , мержаець  $\bar{y} -b_{\lambda\tau}$  уздымаецца  $\bar{y}$  кірунку спіну  $\bar{y}$ ;



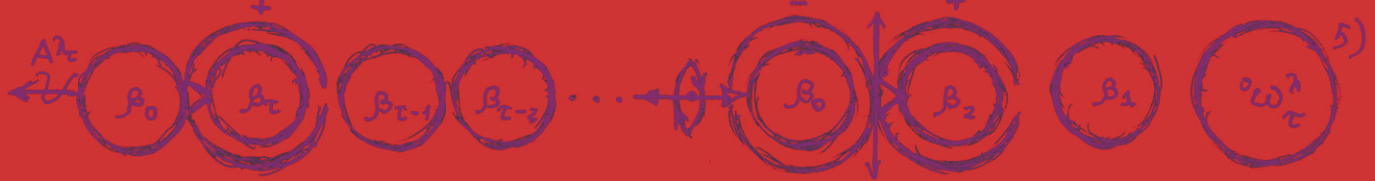
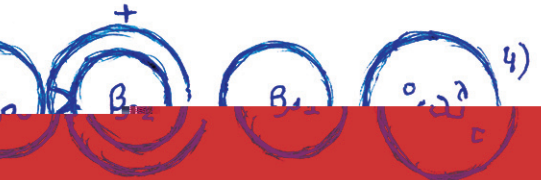
2) ковая  $\beta$ -рэ  $\beta_1$  узнікае  $\bar{y}$  выніку  $\bar{y}$  маху  $\bar{y}$  на  $\Delta \lambda_{\tau}$  месцы  $\bar{y}$  адку  $\beta_0$  і выцяскае  $\beta_0$  на  $\Delta \lambda_{\tau}$  у поле  $A^{\lambda}$ ; знак  $<$  - указальнік хвалі (вандроўнага ладу) руху навучэння  $\chi^{\rho\lambda} \leftarrow \lambda$ ; хваля рухаецца разам з фатоном; мержа хвалі (калькацыя  $\tau^{\lambda\tau}$  яе месцаў); -калер фатона; хваля  $\{\omega_{\tau}^{\lambda} \leftrightarrow 1, \dots, \lambda\}$  - амон колеру;



3)  $\beta_0$  -улада негатрона, таму мехалон  $\bar{y} b_{\lambda\tau}$  рухаюцца  $\chi^{\rho\lambda}$  ашортваецца валам  $\beta_0$ , змяняе лад на рэха  $\bar{y}$  і узнікае пазітрон з яго спінам  $\bar{y}$ , уключае рэа  $\omega_{\tau}^{\lambda}$  у амон  $+b_{\lambda\tau}$  і выконвае карговы  $\bar{y}$  маху  $\bar{y}$ ;



4), 5) адзінка  $\beta_2$  якая ўзнікае  $\bar{y}$  маху  $\bar{y}$  пазітрона, выцяскае  $\beta_0$  у поле эфіру  $A^{\lambda}$ , амон  $+b_{\lambda\tau}$  яе рухаюцца  $\chi^{\rho\lambda}$  змяняецца на яго рэха  $\bar{y} b_{\lambda\tau}$ ; квалі негатрон працягвае рух фатона; улада  $\beta_0$  захоўваецца ўвесь час і нававак фатона  $\bar{y} \chi_{em}^{\lambda}$  і захоўвае сувязь з  $\Delta \lambda_{\tau}$  і  $\bar{y}$  маху  $\bar{y}$ ;

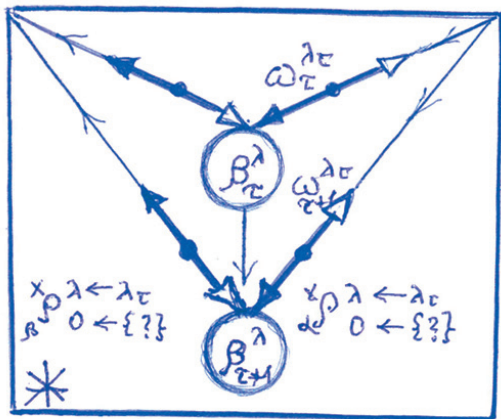


6) паларызацыя: 6.1) мехалон  $\bar{y} b_{\lambda\tau}$  фатона  $\bar{y} \chi_{em}^{\lambda}$  трэкаецца; 6.2) вiд з адну трэанкутага мехалона; 6.3) малітмная станы паларызацыі.

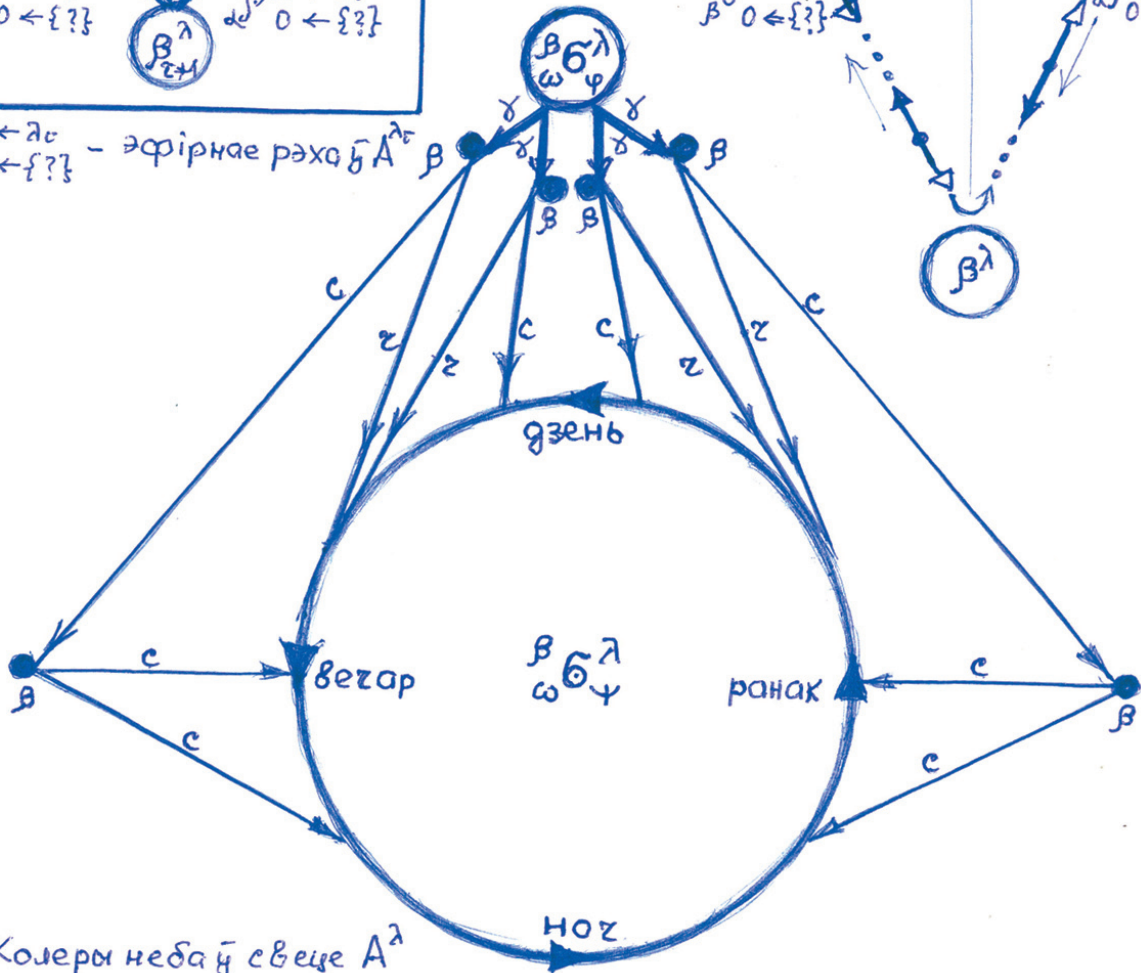
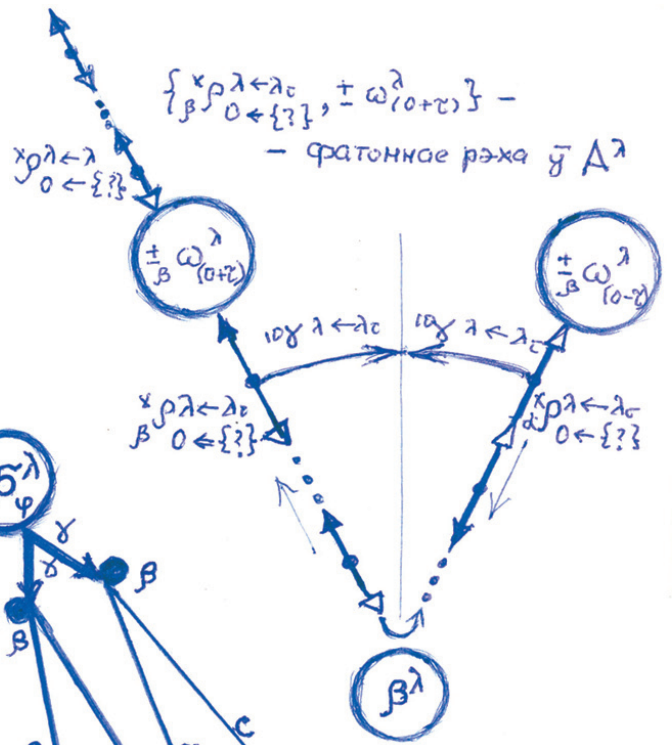
Хваля вандроўнага ладу, якая апынаецца перад фатоном  $\bar{y} \chi_{em}^{\lambda}$  у полі эфіру  $A^{\lambda}$ , можа мець  $\tau^{\lambda\tau}$  мержа  $\bar{y} \{\omega_{\tau}^{\lambda} \leftrightarrow 1, \dots, \lambda\}$ . Хваля ўзнікае калі кола  $b_{10+1}^{\lambda}$  пратона  $\omega_{\tau}^{\lambda}$  уключае мержа за  $10^{\lambda\tau}$  эфірных рэхаў  $\{\omega_{\tau}^{\lambda}\}$  і з-за гэтага мержа дабудовуецца до цяга  $\lambda$  на сістэму  $\beta_0$ . Колькасць сістэм  $\{\omega_{\tau}^{\lambda}\}$  з'яўляе мехалон  $\bar{y} b_{\lambda\tau}$  мержа ўключаецца з поля  $A^{\lambda}$  у працэсе яго дабудовы  $\bar{y}$  колер фатона (даўжыня яго эфірнай хвалі). Знак колеру захоўваецца і  $\bar{y}$  паліцы  $\bar{y}$  адку фатона - адзінкі тунану  $\beta_0$ ; хваля фатона - яго амон колеру. Рух  $\chi^{\rho\lambda}$  фатона  $\bar{y} \chi_{em}^{\lambda} \leftrightarrow \bar{y} \omega_{\tau}^{\lambda}$ , як і рух сістэм  $\omega_{\tau}^{\lambda}$ ,  $\bar{y} \omega_{\tau}^{\lambda}$ ,  $\bar{y} \omega_{\tau}^{\lambda}$  мае хуткасць  $\pm 1 \text{ сн}^{\lambda} / \pm 1 \text{ м}^{\lambda}$ . Але (у адрозненне ад звычайных сістэм) ён можа мержа выконвацца на гарэ  $\bar{y}$  рознага  $\bar{y}$ ; вяртаць іх у мержа мержа (літаваці этан спакую), рух фатона выконваецца  $\bar{y}$  адзінкі кірунку, і  $\bar{y}$  гэтым кірунку хуткасць фатона з'яўляе адзінку хуткасць пратонаў і кірункаў  $\bar{y} \omega_{\tau}^{\lambda}$ ,  $\bar{y} \omega_{\tau}^{\lambda}$ . Кірунак руху фатона можа змяняцца хімернагай уладай свету  $A^{\lambda}$ .

Калі фотон узнікае з боку дзе влікае колькасць  $\beta$ -сістэм,  $\bar{y}$  каляровы амон рэа, калі з боку дзе влікае колькасць эфіру, амон сфармавацца (мержа і мержа сфармавацца).

$\beta^\lambda \otimes \frac{\pm}{\beta} \omega^\lambda$  - фотоннае рэха, колеры неба



$x^rho lambda - lambda_c$   
 $\beta$   $0 \leftarrow \{??\}$  - эфірнае рэха  $\bar{A}^{\lambda\gamma}$

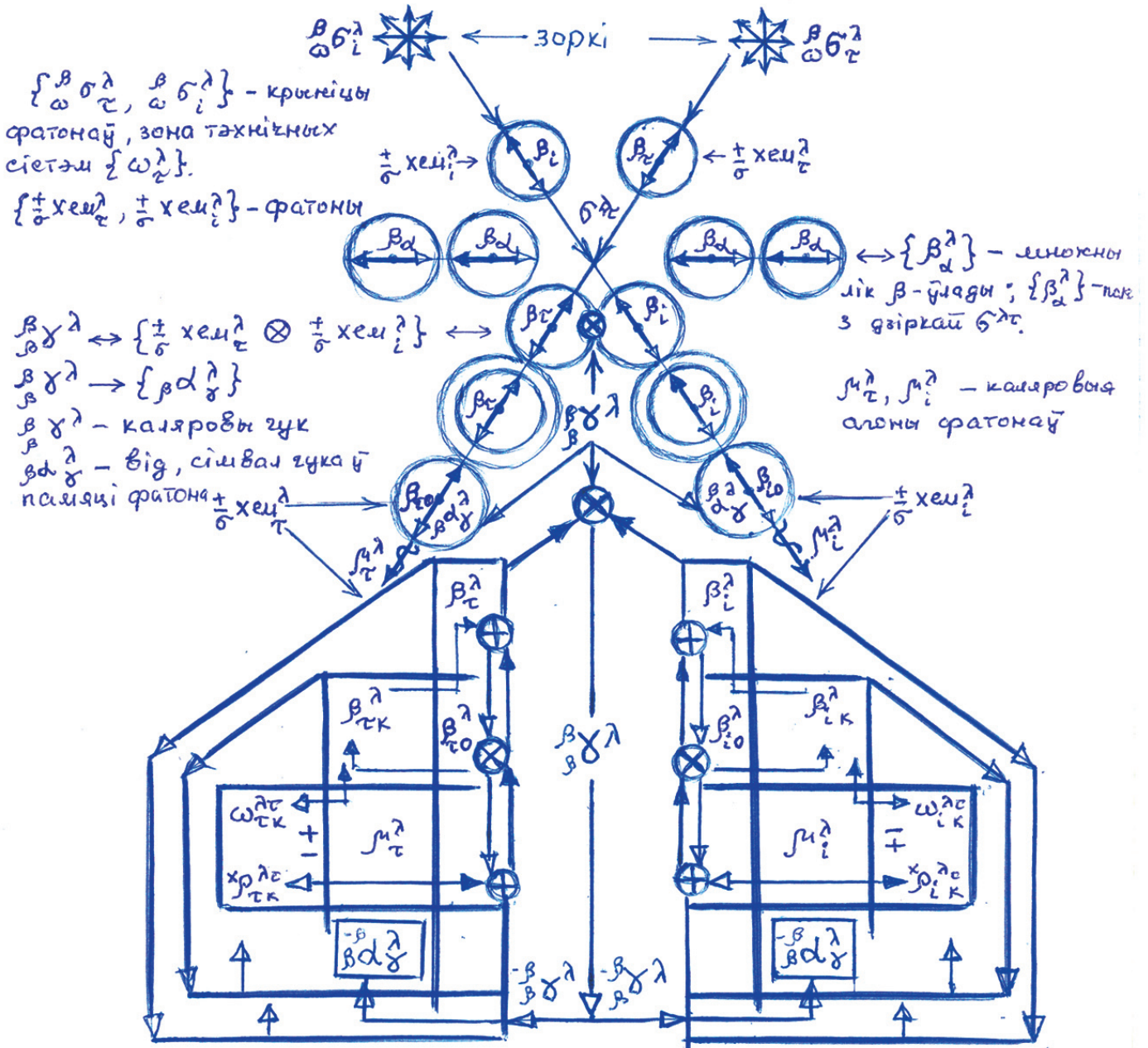


Колеры неба ў сьвечы  $A^\lambda$

Схема  $\mathcal{J}$  (эфірнае рэха  $\bar{A}^{\lambda\gamma}$ ) - аснова схем фотоннага рэха; стаяк эфірных рэчаў  $\omega^{\lambda\sigma}$  з адзінакай туману  $\beta^\lambda$  ёсоўвае  $\beta^\lambda$ , таму доўгія хвалі руху навузання адзінаюцца мацкэй за кароткія. Схема фотоннага рэха вышэйкае з  $\mathcal{J}$  з унікал стаякаў  $\{\beta^\lambda \otimes \frac{\pm}{\beta} \omega^{\lambda\sigma}\}$ ; фатоны ляцяць разам з іх калярывымі агонямі і адзінаюцца на вугах згіню агона. Схема колераў неба  $\bar{A}^\lambda$  азначае ўсе магчымныя станы фотоннага рэха. Сістэма  $\omega^{\lambda\psi} =$  зорка, крыжкіца фатонаў  $\{\delta\}$ , прамень далага сьвятла  $\delta$  уключае ўсю зашчу колераў;  $\omega^{\lambda\psi}$  - цяжкі звяз (вэлікая колькасць) тэхнічных адзінак:  $\omega^{\lambda\psi} \leftrightarrow \{\omega^{\lambda\sigma}\}$ . Звяз  $\omega^{\lambda\psi}$  сьвязвае эфір  $\{\omega^{\lambda\sigma}\}$  і ў яго махах узнікае зона туману (рэчаў  $\{\beta\}$ ). На адзінаках туману  $\{\beta\}$  зорныя прамяні  $\{\delta\}$  размяркоўваюцца па колерах; чырвоныя (літара  $z$ ) маюць доўгія калярывыя агонь і адзінаюцца мацкэй за ськія (літара  $e$ ). Ч выніку ў месяц 'дзень' неба сіньяе, а ў месяц 'везар', 'ранак' неба чырвонае на гарызонце (у кірунку на зорку, ае захад і ўсход) і сіньяе ўверсе - там апынаюцца адны сінья фатоны зоркі  $\omega^{\lambda\psi}$ .



$\{\frac{\pm}{\sigma} \text{хем}_\tau^\lambda \otimes \frac{\pm}{\sigma} \text{хем}_i^\lambda\}$  - каляровы зук у стыках фратонаў і галаграмы ў іх памяці



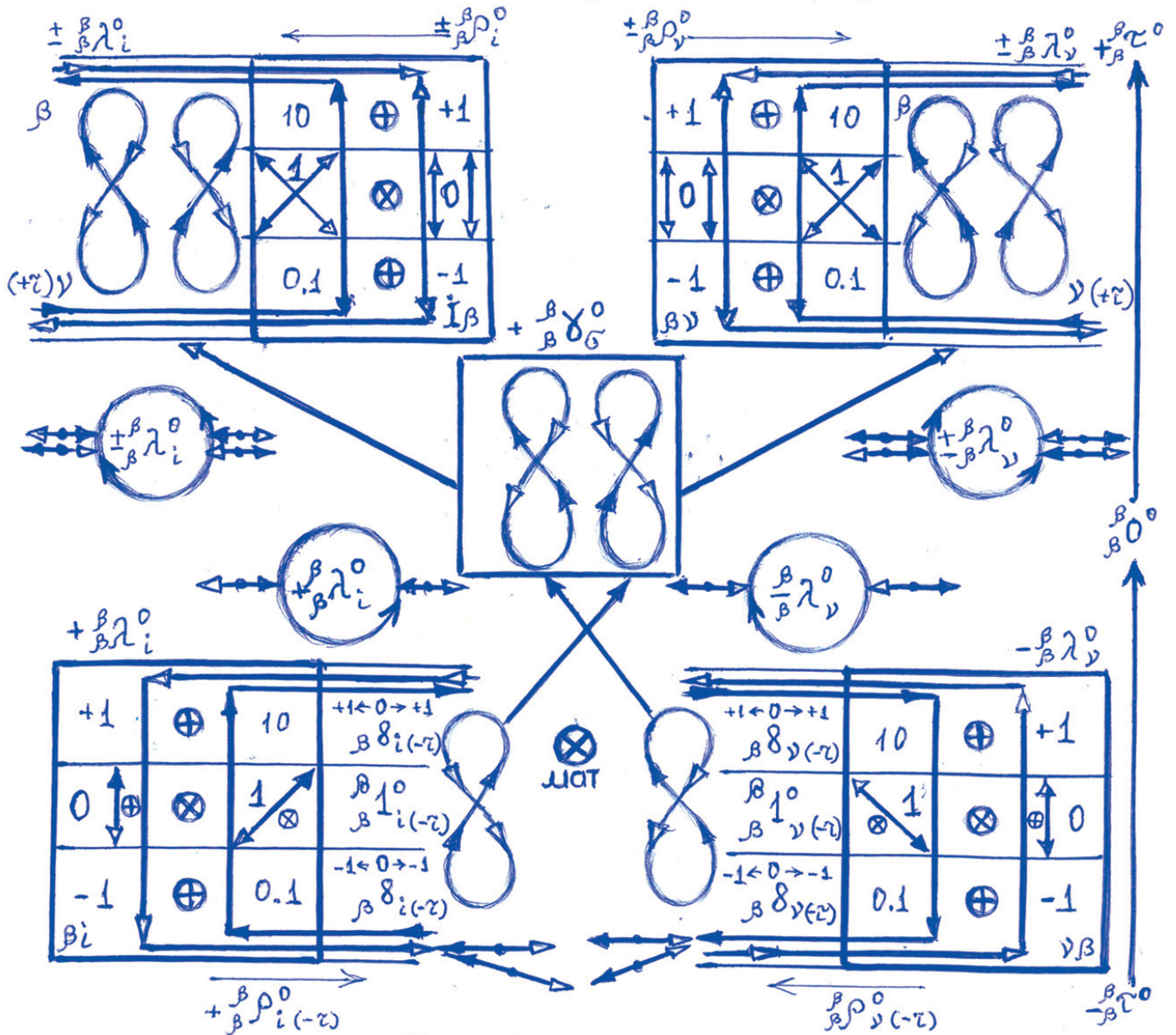
Фратоны  $\{\frac{\pm}{\sigma} \text{хем}_\tau^\lambda, \frac{\pm}{\sigma} \text{хем}_i^\lambda\}$  з розных крыніц  $\{\omega_{\sigma\tau}^\lambda, \omega_{\sigma i}^\lambda\}$  лінаюць  $\beta$ -паке  $\{\beta_{\alpha\delta}^\lambda\}$ , а іх адзінкі тыману  $\{\beta_{\sigma\tau}^\lambda, \beta_{\sigma i}^\lambda\}$  рухаюцца ў адваротным кірунку і сутракаюцца каля звёркі  $\beta_{\sigma\tau}^\lambda$  у пак  $\{\beta_{\alpha\delta}^\lambda\}$ .

Стык  $\beta_{\sigma\gamma}^\lambda \leftrightarrow \{\frac{\pm}{\sigma} \text{хем}_\tau^\lambda \otimes \frac{\pm}{\sigma} \text{хем}_i^\lambda\}$  - каляровы зук у якім улізаны меркі  $\mu_\tau^\lambda, \mu_i^\lambda$  каляровых асноваў. Гэты зук захоўваецца ў  $\beta$ -рэках (шэцігах сток) да адмыку з пак  $\{\beta_{\alpha\delta}^\lambda\}$ .

Сімвал  $\beta_{\alpha\delta}^\lambda$  зук  $\beta_{\sigma\gamma}^\lambda$  апынаецца ў памяці  $\alpha$ -ўладу сістэм  $\omega_\tau^\lambda$  і  $\omega_i^\lambda$  (крыніц фратонаў  $\frac{\pm}{\sigma} \text{хем}_\tau^\lambda$  і  $\frac{\pm}{\sigma} \text{хем}_i^\lambda$ ). Ам фратоны маюць разам з  $\alpha$ -ўладай і  $\beta$ -ўладу - вядучы адзінкі тыману  $\beta_{\sigma\tau}^\lambda$  і  $\beta_{\sigma i}^\lambda$ . Від  $\beta_{\alpha\delta}^\lambda$  апынаецца і ў памяці гэтых  $\beta$ -адзінкаў годнай адмыквання з пак  $\{\beta_{\alpha\delta}^\lambda\}$  і з пак  $\{\beta_{\alpha\delta}^\lambda\}$  стае шэцігам адмыку ў сток з фратонамі гэты вузлы з  $\beta$ -ўладай аднаўляюць лінаючы вузлы  $\beta_{\sigma\gamma}^\lambda$ .

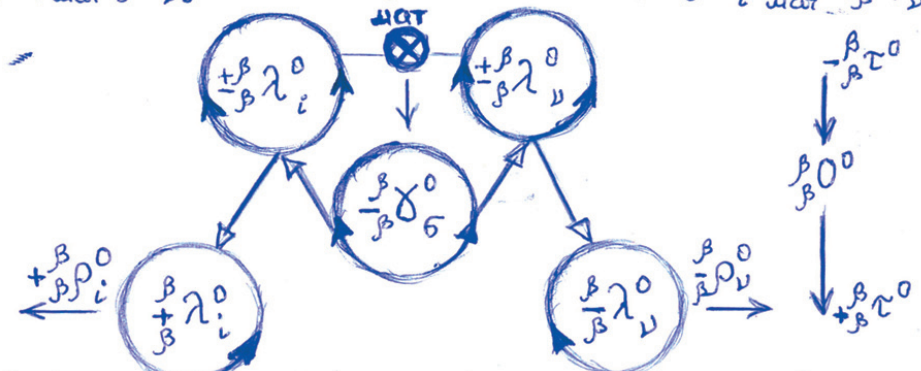
Від  $\beta_{\alpha\delta}^\lambda$  - галаграма ўсёй зоны  $\omega_{\sigma\tau}^\lambda \leftrightarrow \{\omega_{\sigma\tau}^\lambda, \omega_{\sigma i}^\lambda\}$  чыя фратоны - шэцігы сток  $\beta_{\sigma\gamma}^\lambda$ . Згадані від - хімерычнае ўлада зоны  $\omega_{\sigma\tau}^\lambda$ , яе сімвал. Змені від  $\beta_{\alpha\delta}^\lambda$  ў памяці фратонаў змяняюць і зону-крыніцу від  $\beta_{\sigma\gamma}^\lambda$  (у той мерк, у якой від  $\beta_{\alpha\delta}^\lambda$  пануе ў гэтай зоне).

$\Lambda^0 | \{ +\beta \lambda_i^0 \otimes_{\text{mat}} -\beta \lambda_\nu^0 \} - \text{обмен матау у стыках хімеронау}$



$$+\beta \lambda_i^0 \otimes_{\text{mat}} -\beta \lambda_\nu^0 \leftrightarrow \{ \beta \delta_i^0 \otimes_{\text{mat}} \beta \delta_\nu^0 \} \rightarrow +\beta \delta_\sigma^0 | \{ \beta \lambda_i^0, \beta \lambda_\nu^0 \} \rightarrow \{ +\beta \lambda_i^0, +\beta \lambda_\nu^0 \}$$

Схема  $\Lambda^0 | \{ +\beta \lambda_i^0 \otimes_{\text{mat}} -\beta \lambda_\nu^0 \}$  мае рэхаваю схему  $\Lambda^0 | \{ +\beta \lambda_i^0 \otimes_{\text{mat}} +\beta \lambda_\nu^0 \}$ :



$$+\beta \lambda_i^0 \otimes_{\text{mat}} +\beta \lambda_\nu^0 \leftrightarrow -\beta \delta_\sigma^0 | \{ +\beta \lambda_i^0, +\beta \lambda_\nu^0 \} \rightarrow \{ +\beta \lambda_i^0, -\beta \lambda_\nu^0 \}$$

Абмен хімеронау іх матамі (механізмамі руху) дае магчымасць змяніць асобныя хімероны (натуральны і рэхава мейцыя стыку (ашту імпэтаньі)) на счэгаваюць ці счэгаваюць мейцыя стыку на асобныя (натуральны і рэхава). Зьмену ёшчоньдас орт хімеронау улава  $\beta \delta_\sigma^0$  які ўзнікае ў акце стыку.

$\Lambda^0 | \beta \alpha \lambda_{\nu\tau}^0$  - лікавы магніт (хімат)

$\beta \chi_{\nu}^0 \leftrightarrow \beta \alpha \lambda_{\nu\tau}^0 \leftrightarrow \beta \alpha 1_{\nu\tau}^0$   
 $\beta \chi_{\nu}^0 \leftrightarrow \beta \lambda_{\nu}^0 \leftrightarrow \beta \delta_{\nu}^0 \leftrightarrow \beta \lambda_{\tau}^0 \leftrightarrow \beta \delta_{\tau}^0 \leftrightarrow \beta 1_{\tau}^0$

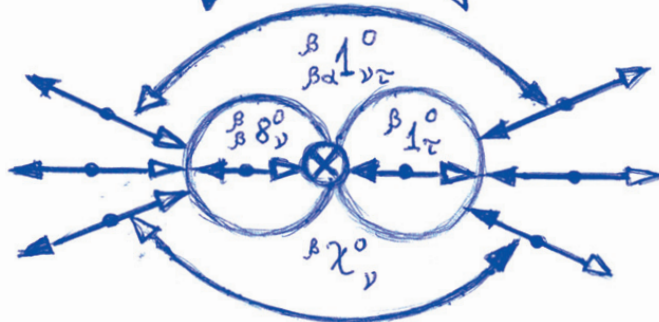
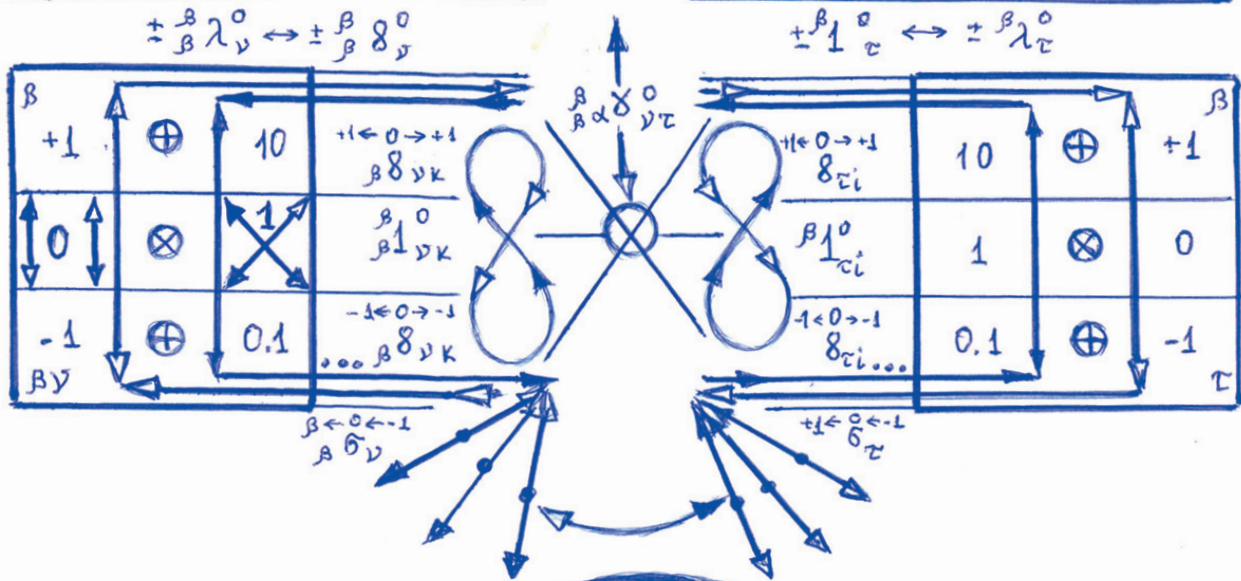
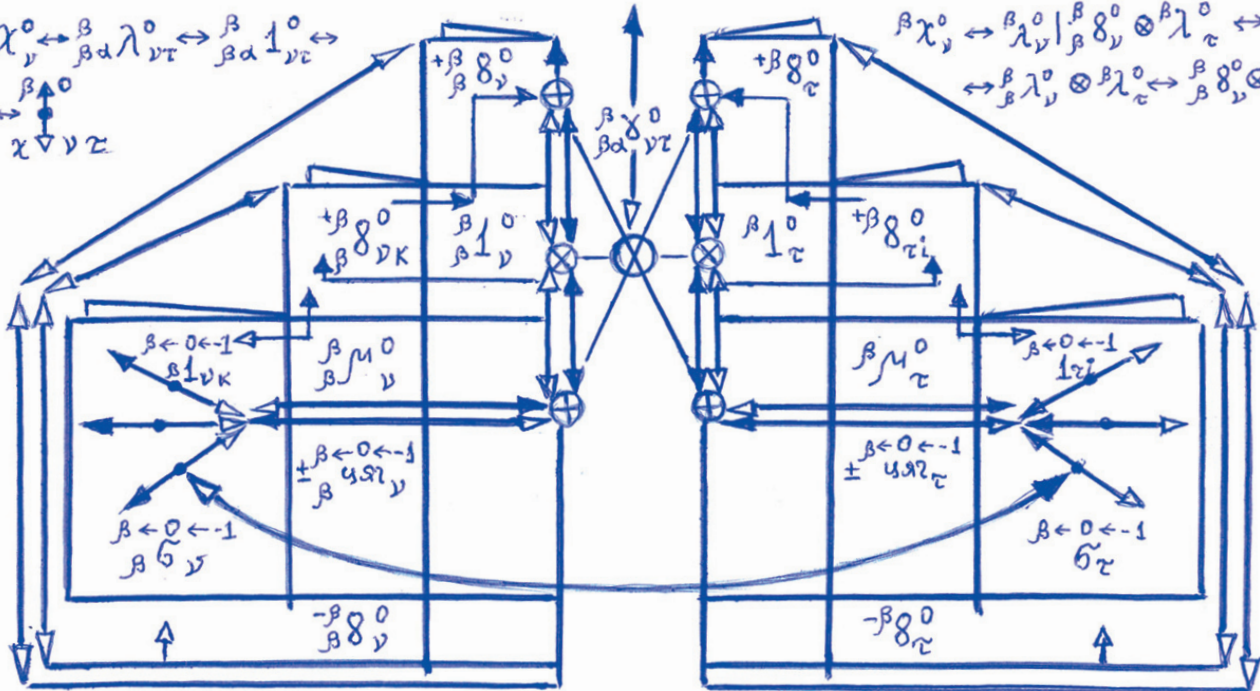
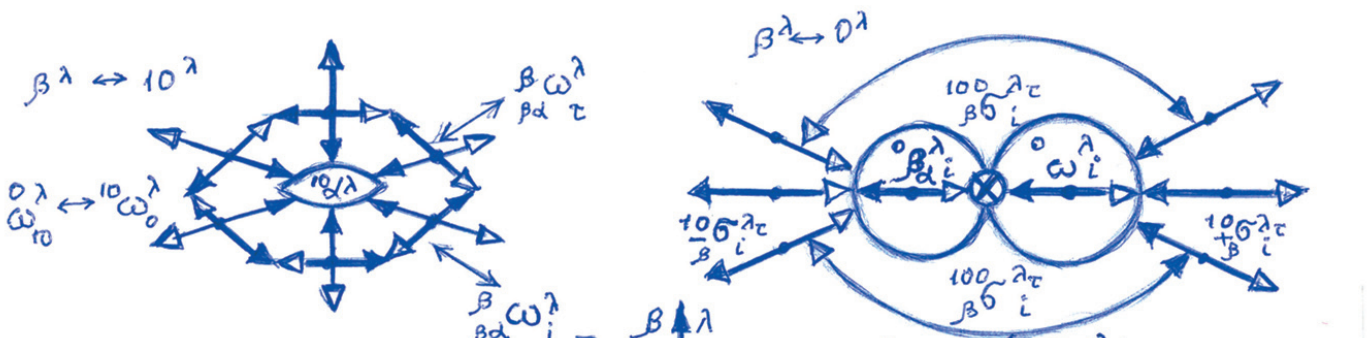


Схема  $\Lambda^0 | \beta \alpha \lambda_{\nu\tau}^0$  уключае натуральны і рэхавы лікавы магніт - хімат (у прапанаваным узоры сактывізаваны натуральны магніт). Хімат  $\beta \chi_{\nu\tau}^0$  - лік які звязвае хімерны агон (адзімку туману  $\beta \delta_{\nu}^0$  ліка  $\beta \lambda_{\nu}^0$  і тэхнічную адзімку  $\beta \lambda_{\tau}^0$  у сістэму з многімі лікамі цягі ў механічным агоне; з множным лікам уладу):

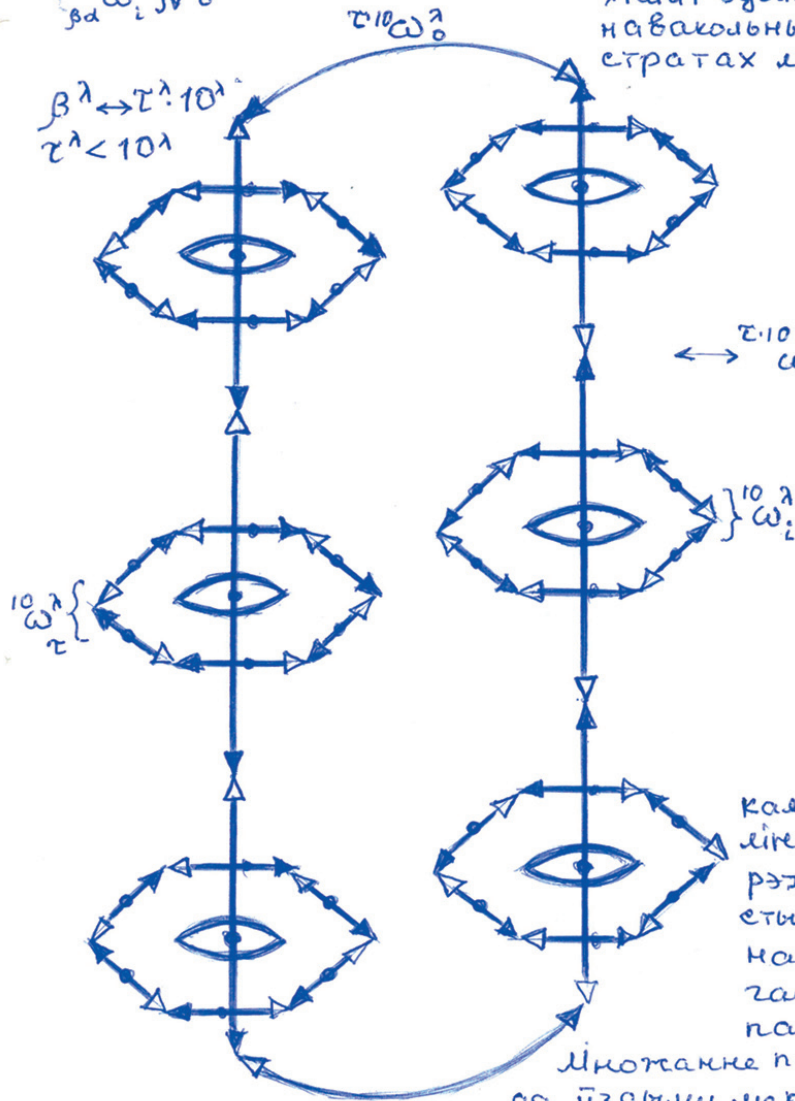
$\beta \chi_{\nu\tau}^0 \leftrightarrow \{ \beta \delta_{\nu}^0 \oplus \beta \delta_{\tau}^0 \}, \beta \alpha \delta_{\nu\tau}^0 \leftrightarrow \{ \beta 1_{\nu}^0 \otimes \beta 1_{\tau}^0 \} \leftrightarrow \{ \beta \alpha_{\nu}^0 \otimes \beta \alpha_{\tau}^0 \}$

Лік  $\beta \lambda_{\tau}^0$  у хімаце - асноўны, а лік  $\beta \lambda_{\nu}^0$  (зоя адзімка туману ўключана ў хімат) - вядуцы: ўключэнне  $\beta$ -ўладу дае магчымаць змяняць цягу і рух ліка-асноўна. Змяна цяга дазваляе лікам-магнітам сувязьца ў гараду, кола, кумб і звязваць (разам з хімернымі агонімі) іх механічныя агоні, узгадняць іх-рухі.



$0^\lambda \leftrightarrow 10^\lambda \omega_0 - 10$ -ты диаметр  $0^\lambda$  -  $10$ -ты кон  
 тутаральнай улагы  $\bar{y}$  полі  $\beta^\lambda$ ; яго  
 мех агон - кола  $\chi$ імат $\bar{y}$ , а хем  
 агон - множны лік  $\delta$ іамера $\bar{y}$ ;

$\beta^\lambda \leftrightarrow 0^\lambda$   
 $\beta \leftrightarrow \tau + 0$   
 $\tau^\lambda < 10^\lambda$   
 $\beta \omega_i^\lambda \leftrightarrow \{ \beta \otimes \omega \}_i^\lambda \leftrightarrow \{ \text{хеи} \otimes \text{тэх} \}_i^\lambda \leftrightarrow \text{хімат}_i^\lambda$   
 $\beta \omega_i^\lambda$  - магніт, сімвал поля  $0^\lambda$  тэхнічных  
 сістэм з хімерызнай улагай і механічнымі  
 агонамі розных знакаў і мернасці;  
 $\chi$ імат здольны змяняць поле  $A^\lambda$ , рух яго  
 навакольных сістэм і звязвацца з імі на ўсіх  
 стратах маха ( $\beta$ ,  $\alpha$  і  $\delta$  - палях).



$\{ \tau \cdot 10^\lambda \}$   
 $\tau \cdot 10^\lambda \leftrightarrow \tau \cdot 10^\lambda \omega_0 \leftrightarrow \tau \cdot 10^\lambda \alpha$  - памер сагнуці  $\bar{y}$  кола  
 $10^\lambda \omega_0 \leftrightarrow \{ 10^\lambda \omega_i \}$

механічны агон памера - кола  
 дыамера $\bar{y}$ , хімерызны агон - множны  
 лік памера $\bar{y}$ ;  
 дыаметры  $\bar{y}$  механічне памера  
 звязаныя ўсімі стратамі іх  
 махаў і магнітамі іх улаг; іх  
 гэці абмену гнуткія і здольныя  
 расцягвацца;

калі кола памера выцягваецца ў дваіную  
 лінейю, дыаметры  $10^\lambda \omega_\tau$  і  $10^\lambda \omega_i$  апякаюцца  
 рэжам адзін аднаго; гэта імітацыя  
 стыкаў  $\{ \text{тэх} \otimes \text{хэт} \}$  сістэм і яе  
 навакольнага свету узшмацняе  
 гэці абмену дыамераў у мех агоне  
 памера.

Множакне памераў і іх складанне вядзе  
 да ўздыму мернасці  $\beta^\lambda \rightarrow 100^\lambda$  і ўзнікненню  
 гошана  $100^\lambda \omega_0$  - адзінкі свету ведаў  $100^\lambda A^\lambda$ , улагы дыалягічнага свету  $10^\lambda A^\lambda$ .  
 Гошан -  $100$ -ты кон тутаральнай улагы  $\bar{y}$   $A^\lambda$ .

$$\{ +r_{\sigma \rightarrow \omega}^{\lambda}, +r_{\omega \rightarrow \sigma}^{\lambda}, +r_{\sigma \rightarrow \omega}^{\beta} \} - \text{акти руху } r^{\lambda}$$

Акты руху  $r^{\lambda}$  - механізм лаха? Их гарга ю працэсе змены свету - закон механікі  $R^{\lambda}$ .  
 Метки  $\{x, t, \lambda, \beta, \omega\}$  акіяў  $\{r_{\sigma}^{\lambda}\}$  у заданай гарзе - знак іх ладу, межана, пернаці, асноўні мэтн. Асноўні мэта ружаў - рэз (адзінкавылік) і пам (множнылік, хмара). Рэз і паме гарзуючы ю руху  $r^{\lambda}$  асць змяняюць іх асноўні на мэтн: рэз змяняе ю на пам, а пам на ю на рэз. Асноўні мэта асць  $r_{\sigma}^{\lambda}$  маюць розны лад, а ўздох пернаці ю мэтне вострымае чыгу. У руху  $r^{\lambda}$  туманная мэта (мара) стае метрыкай, мрэй, хмарай, апытаючы мэткай, памыці (змее). Здыейская мэта - мятя (кон, шра), апа спынае лінуць акт і стае асноў, гарцовага зыа мэта ўзнікае ю тумане  $r^{\lambda}$  і чыгне змены руху.

$r_{\sigma}^{\lambda} \rightarrow \lambda$  - натуральная гісторыя свету  $A^{\lambda}$

Натуральная гісторыя свету  $A^{\lambda}$  - рух мінулага свету  $A^{\lambda\sigma}$  ( $\lambda \rightarrow \lambda$ ). Дзякуючы акт  $\alpha^{\lambda} | A^{\lambda\sigma}$  руху навуэння, свет  $A^{\lambda\sigma}$  (які зно мінулы свет  $A^{\lambda\sigma}$  ( $\lambda \rightarrow \lambda$ )) мае юе меркі асць  $A^{\lambda}$ , ю іх ліку - сказ  $\alpha^{\lambda} | A^{\lambda\sigma}$  і  $\text{big } \alpha^{\lambda} | A^{\lambda\sigma}$ .

Акт  $r_{\sigma}^{\lambda} \rightarrow \lambda$  натуральнай гісторыі свету  $A^{\lambda}$  мае асноўнай паме  $\beta^{\lambda\sigma}$  тэхнічна адзінка  $\{\omega_{\sigma}^{\lambda}\}$  - вынікаю механіку  $r_{\omega \rightarrow \sigma}^{\lambda}$  крошчы свету  $A^{\lambda\sigma}$  (тацальнай уладот ю  $A^{\lambda\sigma}$ ):

$$\text{TOT } \lambda^{\sigma} \leftrightarrow \text{пам } \lambda^{\sigma} \leftrightarrow \overset{\circ}{A} \lambda^{\sigma} \leftrightarrow \overset{\circ}{\omega} \lambda^{\sigma}$$

$$r_{\omega \rightarrow \sigma}^{\lambda} : \overset{\circ}{\omega} \lambda^{\sigma} \rightarrow \{\omega_{\sigma}^{\lambda}\} \leftrightarrow \beta^{\lambda\sigma}$$

Тэхнічныя адзінкі  $\{\omega_{\sigma}^{\lambda}\}$  ю руху навуэння  $\{\alpha^{\lambda} | \omega_{\sigma}^{\lambda}\}$  уключаюць вестн  $\alpha^{\lambda} | \omega_{\sigma}^{\lambda}$  уключі (арх мэт).

$$\alpha^{\lambda} | \omega_{\sigma}^{\lambda}; r_{\sigma}^{\lambda}$$

$$\lambda \sigma \leftrightarrow \lambda \sigma$$

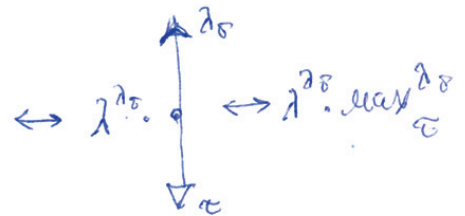
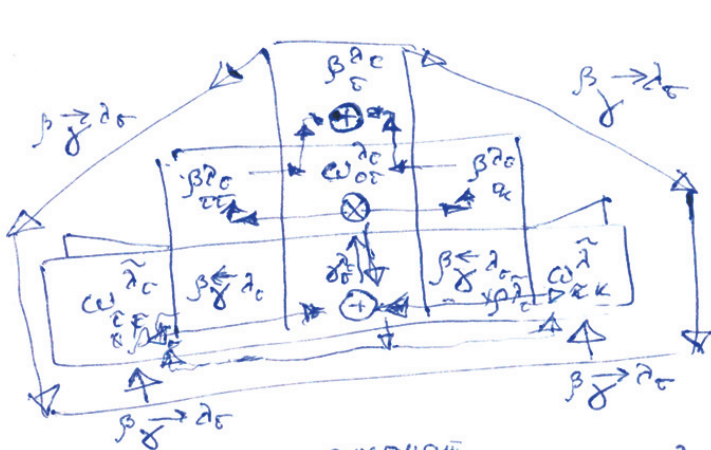
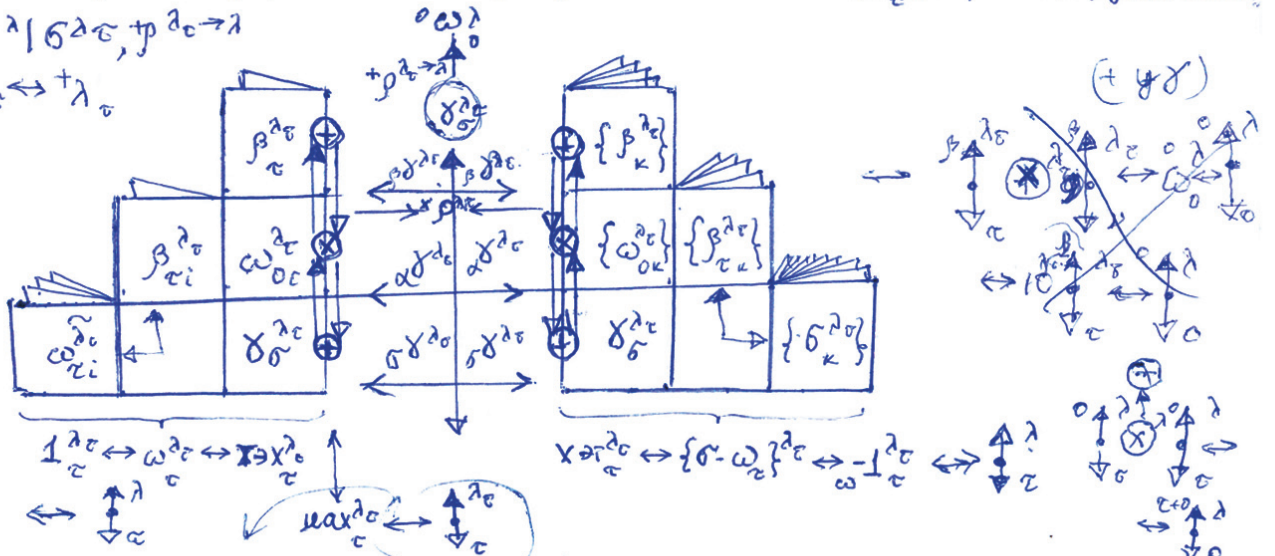


Схема  $\alpha^{\lambda} | \omega_{\sigma}^{\lambda}$  - тэхнічна адзінка  $\omega_{\sigma}^{\lambda}$  свету  $A^{\lambda\sigma}$  і механіку  $r_{\omega \rightarrow \sigma}^{\lambda}$ . Асноўні мэта ружаў - рэз (адзінкавылік) і пам (множнылік, хмара). Рэз і паме гарзуючы ю руху  $r^{\lambda}$  асць змяняюць іх асноўні на мэтн: рэз змяняе ю на пам, а пам на ю на рэз. Асноўні мэта асць  $r_{\sigma}^{\lambda}$  маюць розны лад, а ўздох пернаці ю мэтне вострымае чыгу. У руху  $r^{\lambda}$  туманная мэта (мара) стае метрыкай, мрэй, хмарай, апытаючы мэткай, памыці (змее). Здыейская мэта - мятя (кон, шра), апа спынае лінуць акт і стае асноў, гарцовага зыа мэта ўзнікае ю тумане  $r^{\lambda}$  і чыгне змены руху.

Схема  $\alpha^{\lambda} | \beta^{\lambda}$  уключае віды тэхнічнай сістэмы  $\omega^{\lambda c}$  і яе навакольнага свету, сагнутога ў куты. Гэта дазваляе азначыць рух складання свету  $\Lambda^{\lambda}$  (яго натуральную гісторыю) яе рух складання іерархічных схем  $\{\alpha^{\lambda c}\}$  іной множнай лік  $\{\beta^{\lambda c}\}$  атрыманні рухам свету.

$$\alpha^{\lambda} | \beta^{\lambda c}, \tau^{\lambda c} \rightarrow \lambda$$

$$\beta^{\lambda c} \leftrightarrow +\lambda_c$$



Зінанне віда  $\alpha^{\lambda}$  у кут дае магчымасць натуральнага складання  $\tau^{\lambda \rightarrow \beta}$  іерархічнай схем. Вынік руху  $\tau^{\lambda \rightarrow \beta}$  новая іерархічная схема з уздымамі мернасці. (Рухам множнай і складання схем атрыманні гон  $\beta^{\lambda}$ )

Месцы руху  $\tau^{\lambda \rightarrow \beta}$  (схемы зместу асновы руху складання  $\tau^{\lambda \rightarrow \beta}$ ) маюць ёйкіныя ўсіх метаняў-аў і механічных асноваў да вімергных, а рухам абмену загавяюць памуюныя адзінкі - дзакуючы іх га чым. (Іерархічныя сістэмы ў механіцы р<sup>λ</sup> звязваючы коламі ўладу якія месцаў на метах сістэм.)

Новы орт  $\beta^{\lambda}$  (новая мернасць дзе выконваецца рух складання  $\tau^{\lambda \rightarrow \beta}$ ) узнікае ў полі гацяў абмені тымана  $\beta^{\lambda}$ . З гэтага орта ўлада ўнікае ў змест уіх мінучых метаняў за  $1 \text{ мін}^2$ , апынаецца раней за ўсе мінучыя часы і асортвае іх подем новай мэтаі.

Месца зіну схем  $\alpha^{\lambda}$  - гон яе маха (месца сіржак - відаў руху множнай і складання). Вір маха  $\Lambda^{\lambda}$  магнітная сіржак  $\uparrow \downarrow \lambda$  - сімвал руху  $\rho^{\lambda}$  схем  $\alpha^{\lambda}$  і яе сімвал як рухомай іерархічнай адзінкі.

Сімвалы іерархічных сістэм узнікаюць у месцах зіну, у іх стыхах, гацяў абмену, сцягванне - месцах унікальна ў іх змест і ўздыму іх мернасці. Сімвал  $\uparrow \downarrow \lambda$  сцягвае (стыкуе) множнай лік гадзін (мінучых  $\lambda_c$ , памуюны  $\lambda$  і ўзнікаючы  $\beta$ ), а ў іх метах-множнай лік гаеу  $\{\omega^{\lambda c}\}$  тэхнічных сістэм  $\{\omega^{\lambda c}\}$  і множнай лік месцаў згаданых сістэм.

Схема  $\alpha^{\lambda} | \beta^{\lambda}$  р<sup>λ</sup>тнага давае здыгаймаа схем і складання лікаў у лікавым корзе, аш ч ёй месцаў актэй і складання і  $\beta^{\lambda}$  вынікаюць зместані ч адзін гон - літ лікаў.

$$\alpha^{\lambda} | \beta^{\lambda c}, \tau^{\lambda c} \rightarrow \lambda$$

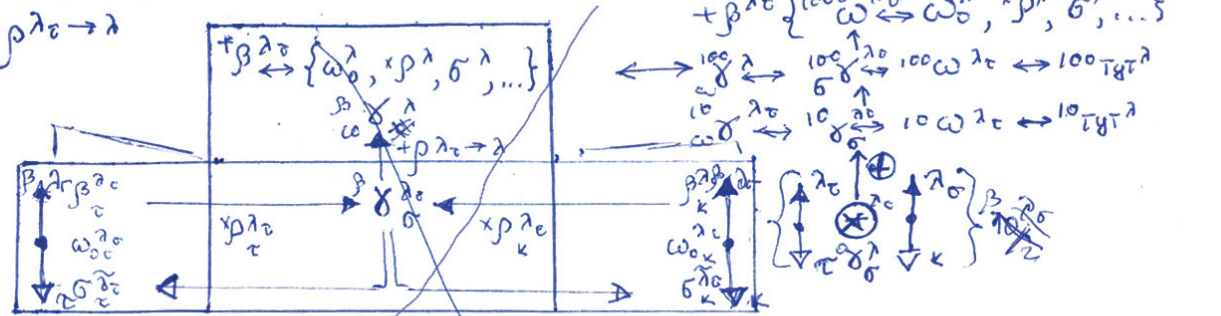


Схема  $\alpha^{\lambda} | \beta^{\lambda}$  р<sup>λ</sup>тнага давае здыгаймаа схем і складання лікаў у лікавым корзе, аш ч ёй месцаў актэй і складання і  $\beta^{\lambda}$  вынікаюць зместані ч адзін гон - літ лікаў.

Схема  $\alpha^{\lambda} | \beta^{\lambda}$  р<sup>λ</sup>тнага давае здыгаймаа схем і складання лікаў у лікавым корзе, аш ч ёй месцаў актэй і складання і  $\beta^{\lambda}$  вынікаюць зместані ч адзін гон - літ лікаў.

Меркі татаальнай уладат апынаюцца за метаі поле яе натуральнай гісторыі.

Рухі асцяўнаа схем  $\alpha^{\lambda}$  - месцаўна механіцы  $\rho^{\lambda}$

$$dI_{\beta}^{\lambda} \rightarrow \lambda$$

$$\lambda_c \leftrightarrow \lambda_c$$

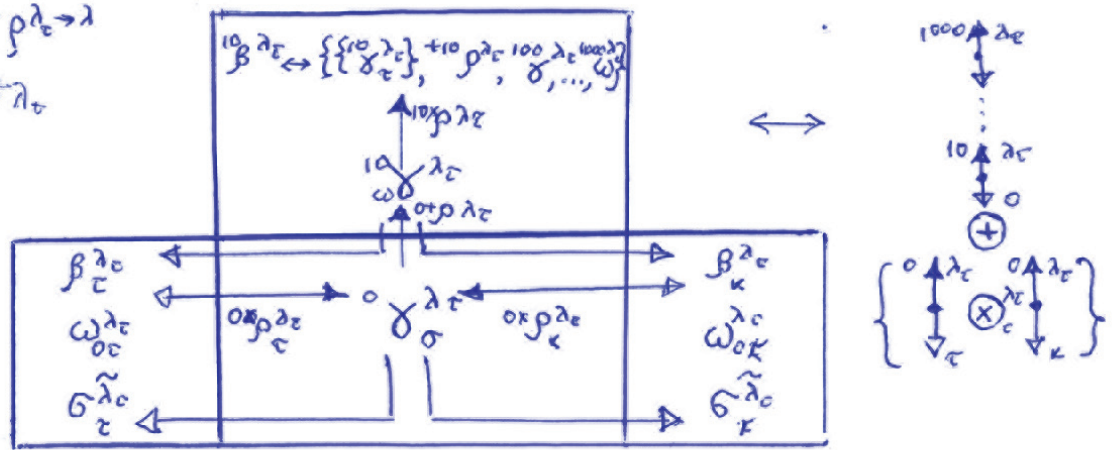
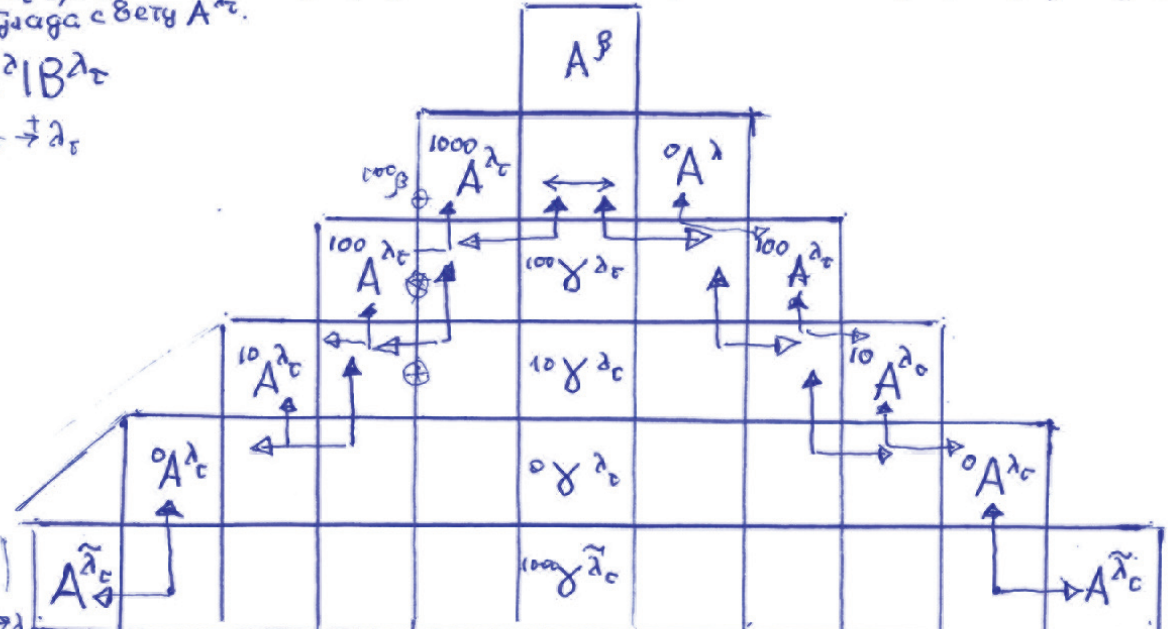


Схема  $dI_{\beta}^{\lambda} \rightarrow \lambda$  - зон зміни метри і меркації  $\beta^{\lambda_c}$  у руху  $\rho_{\lambda_c} \rightarrow \lambda$ , де у галузі абиему  $\sigma_{\lambda_c}$  узниксе орт тутаральнай узорнай улады  $10^0 \gamma_{\lambda_c} \rightarrow 10^0 \rho_{\lambda_c} \rightarrow 10^0 \omega_{\lambda_c} \rightarrow 10^0 \sigma_{\lambda_c}$ , а у нолі метри узниксе де микотенот лік  $\{10^0 \gamma_{\lambda_c}\}$ , рух складання  $10^0 \rho_{\lambda_c}$ , азінкавоі лік орта тутаральнай асветнай улады  $1000 \lambda_c, \dots, 1000 \omega_{\lambda_c}$  - метаулада с вету  $A^{\lambda_c}$ .

$$d^{\lambda} | B^{\lambda_c}$$

$$\lambda_c \leftrightarrow \lambda_c$$



$$d^{\lambda} | B^{\lambda_c} \rho_{\lambda_c} : \omega_{\lambda_c} \rightarrow \sigma_{\lambda_c} \leftrightarrow \{0 A^{\lambda_c} \rightarrow \{0 A^{\lambda_c}\}\} \leftrightarrow \{0 \updownarrow \lambda_c \rightarrow \{0 \updownarrow \lambda_c\}\}$$

$$0 \rho_{\lambda_c} : \sigma_{\lambda_c} \rightarrow 10 \omega_{\lambda_c} \leftrightarrow \{\{0 A^{\lambda_c}\} \rightarrow 10 A^{\lambda_c}\} \leftrightarrow \{\{0 \updownarrow \lambda_c\} \rightarrow 10 \updownarrow \lambda_c\}$$

$$10 \rho_{\lambda_c} : 10 \omega_{\lambda_c} \rightarrow 100 \sigma_{\lambda_c} \leftrightarrow \{10 A^{\lambda_c} \rightarrow \{10 A^{\lambda_c}\}\} \leftrightarrow \{10 \updownarrow \lambda_c \rightarrow \{10 \updownarrow \lambda_c\}\}$$

$$100 \rho_{\lambda_c} : 100 \omega_{\lambda_c} \rightarrow 1000 \sigma_{\lambda_c} \leftrightarrow \{\{10 A^{\lambda_c}\} \rightarrow 1000 A^{\lambda_c}\} \leftrightarrow \{\{10 \updownarrow \lambda_c\} \rightarrow 1000 \updownarrow \lambda_c\}$$

$$1000 \rho_{\lambda_c} : 1000 \omega_{\lambda_c} \rightarrow 10000 \sigma_{\lambda_c} \leftrightarrow \{1000 A^{\lambda_c} \rightarrow \{1000 A^{\lambda_c}\}\} \leftrightarrow \{1000 \updownarrow \lambda_c \rightarrow \{1000 \updownarrow \lambda_c\}\}$$

$$10000 \rho_{\lambda_c} : 10000 \omega_{\lambda_c} \rightarrow 100000 \sigma_{\lambda_c} \leftrightarrow \{\{1000 A^{\lambda_c}\} \rightarrow 100000 A^{\lambda_c}\} \leftrightarrow \{\{1000 \updownarrow \lambda_c\} \rightarrow 100000 \updownarrow \lambda_c\}$$

Гонні  $d^{\lambda} | B^{\lambda_c}$  і  $d^{\lambda} | \Omega^{\lambda_c} \rightarrow \lambda$  звязваюць светот  $A^{\tilde{\lambda}_c}$ ,  $A^{\lambda_c}$ ,  $A^{\lambda}$  і  $A^{\beta}$  і уключяюць усю натуральную гісторію свету  $A^{\lambda}$ .

Схемт  $d^{\lambda} | B^{\lambda_c}$ ;  $d^{\lambda} | \Omega^{\lambda_c} \rightarrow \lambda$  (зон метри  $\beta^{\lambda_c}$  атриманет рухом асветот з зон  $d^{\lambda} | B^{\lambda_c}$ , і камент павук - зон зміноі меркації у крауде узниккенн свету  $A^{\lambda}$ ) звязваюцьсе зметом гідукт мичикнн галузі абиему сімвалау математокі  $d^{\lambda}$  і  $d^{\lambda}$ .







$\alpha^\lambda | \{ \beta \omega_\tau^\lambda \leftrightarrow \sigma \text{Хем}_\tau^\lambda \} - \text{хімероны}$   
 $\lambda \leftrightarrow \{ * \lambda \rightarrow + \lambda \}$

Тэхнічная сістэма (протон, протосістэма свету  $A^\lambda$ )  $\sigma \tau \chi_\tau^\lambda \leftrightarrow \omega_\tau^\lambda$  рухам  $\rho_\tau^\lambda \leftrightarrow \{ \oplus^\lambda; \otimes^\lambda \oplus^\lambda \rightarrow \beta \}$  сцягвае адзіны  $\{ \omega_\tau^\lambda \}$  свету  $A^\lambda$  (поля эфіру) да яе механічнага асяно  $\beta_\tau^\lambda$ . У выніку вага мехалона  $\beta_\tau^\lambda$  - лік  $i^\lambda$  яго колаў  $\beta_\tau^\lambda$  - расце з  $i^\lambda \leftrightarrow 0^\lambda$  (вага  $\alpha_\tau^\lambda$ ) да  $i^\lambda \leftrightarrow \mu_\tau^\lambda \leftrightarrow 10^\lambda$ . Каля  $10^\lambda$  - мэта  $\beta_\tau^\lambda$ , яго кон (мяжа поля абмену).

Месцы  $\{ \omega_\tau^\lambda \}$  колаў  $\beta_\tau^\lambda$ ,  $i^\lambda \leftrightarrow \{ 1, \dots, 10 \}$  звязаныя абменам мернасьці іх ортаў  $\{ \beta_\tau^\lambda \}$ , а орты  $\{ \beta_\tau^\lambda \}$  апінуюцца за конам абмену і кола  $\beta_\tau^\lambda$  мае вандроўны лад.

Адзіны туману  $\{ \beta_\tau^\lambda \}$  узнікаюць у руху  $\rho_\tau^\lambda$  моцью ахутваючых коламі (кулямі)  $\{ \beta_\tau^\lambda \}$  як іх механічныя асянолі  $\{ \beta_\tau^\lambda \}$ . Мерка рэгі  $\beta_\tau^\lambda$  у ангажэменці меней за мерку як крыніца  $\omega_\tau^\lambda$  на мерку сістэмы  $\alpha_\tau^\lambda$ . Таму месцы  $\{ \omega_\tau^\lambda \}$  асяно  $\beta_\tau^\lambda$  рэгі  $\beta_\tau^\lambda$  абменьваюць уздымы мернасьці іх ортаў  $\{ \beta_\tau^\lambda \}$ , іх павароты ўзгадняюцца, рухавая абалонка  $\beta_\tau^\lambda$  сціскаецца ў куму  $\beta_\tau^\lambda$  і ўзнікае хімерон.

Хімерон  $\beta \omega_\tau^\lambda \leftrightarrow \sigma \text{Хем}_\tau^\lambda$  - хімеронная сістэма  $\beta_\tau^\lambda$  з механічным асяном  $\beta_\tau^\lambda$ ; рэгі  $\beta \text{Хем}_\tau^\lambda$  - імітацыя як крыніцы  $\sigma \tau \chi_\tau^\lambda \leftrightarrow \omega_\tau^\lambda$  (пратона) з угадай і мехалонам;  $\{ \omega_\tau^\lambda \}$ ,  $\beta \omega_\tau^\lambda$  - множны лік рэгі  $\sigma \tau \chi_\tau^\lambda$  (туман  $\{ \beta_\tau^\lambda \}$  - множны лік адной улады  $\alpha_\tau^\lambda$ ). Замест улады  $\alpha_\tau^\lambda$  у  $\beta \omega_\tau^\lambda$  працуе адзіна туману  $\beta_\tau^\lambda$ , а ў мехалона  $\beta_\tau^\lambda$  - адно кола:  $\beta \beta_\tau^\lambda \leftrightarrow \beta_\tau^\lambda$  (калі ўзнікае новае кола  $\beta_\tau^\lambda$ , яго апінуюцца за конам абмену ортаў  $\{ \beta_\tau^\lambda \}$  асяно  $\beta_\tau^\lambda$ ).

Хімероны маюць адметныя рэчы асобных станаў знакі цягаў і кірункі абаротаў у абмене ортаў мехалонаў (спіны). Згаданыя рэчы моцью абменьваюцца ў сцягванні стане хімерона. Асобныя станы хімерона:

$+\omega_\tau^\lambda \leftrightarrow + \text{Хем}_\tau^\lambda$  - пазітрон, клонавае імітацыя сістэмы  $\tau \chi_\tau^\lambda$  якая змяшчае яе  $\sigma \tau \chi_\tau^\lambda$  і кірунак абаротаў у  $\beta \Gamma_\tau^\lambda$ ;

$-\omega_\tau^\lambda \leftrightarrow - \text{Хем}_\tau^\lambda$  - негатрон (электрон) - рэхавае імітацыя рэгі  $\tau \chi_\tau^\lambda$  якая змяняе яе  $\sigma \tau \chi_\tau^\lambda$  і кірунак абаротаў у  $\beta \Gamma_\tau^\lambda$  на адваротны (рэхавае).

Сцягванні стан хімерона:

$+\omega_\tau^\lambda \leftrightarrow + \text{Хем}_\tau^\lambda$  - фатон, хімерон які чутас яго цяг  $\alpha_\tau^\lambda$  (з натуральнага ў рэхавае, зноў у натуральна, ...):  $\beta \alpha_\tau^\lambda \rightarrow \beta \text{Цяг}_\tau^\lambda \rightarrow \beta \text{Цяг}_\tau^\lambda \rightarrow \dots$ . Разам з цягам  $\alpha_\tau^\lambda$  чутасца і спін  $\alpha_\tau^\lambda$ .

Фатоны  $+\omega_\tau^\lambda$ ,  $-\omega_\tau^\lambda$  - кванты светла, сьцігі абмену тэхнічных сістэм  $\omega_\tau^\lambda$ ,  $\beta \omega_\tau^\lambda$  у полі  $\beta^\lambda$  адзінамі іх хімероннай і механічнага асяноў у іх рухах  $\{ \beta \rho_\tau^\lambda \}$  - рухах асветы на вольнага поля  $\beta^\lambda$ .

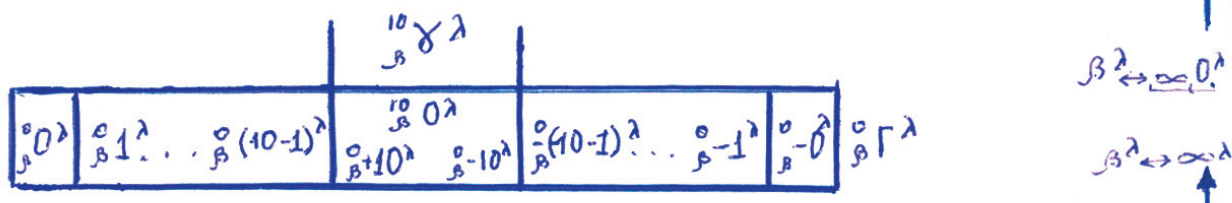
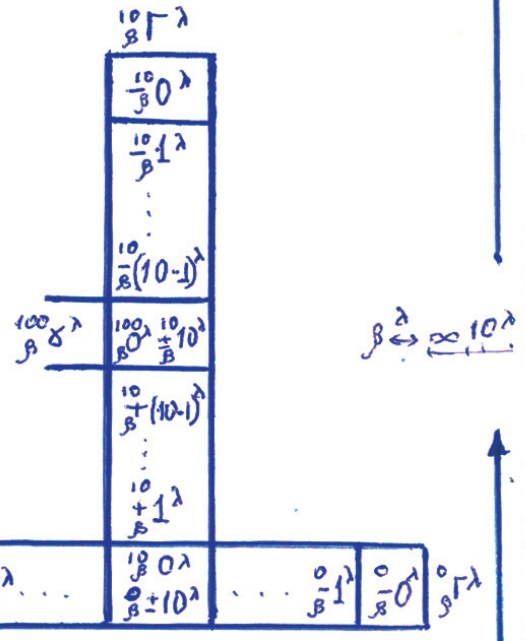
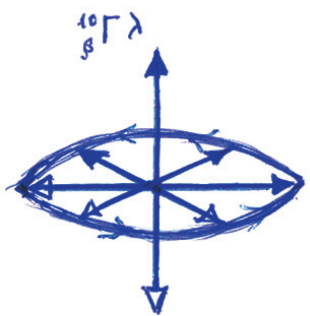
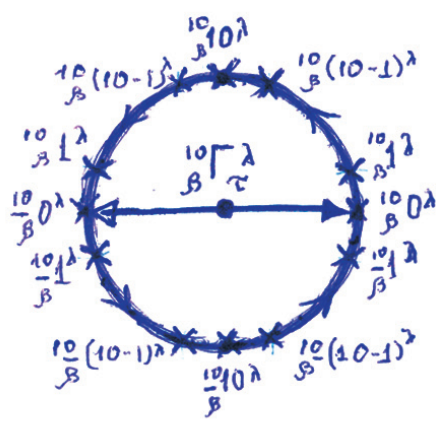
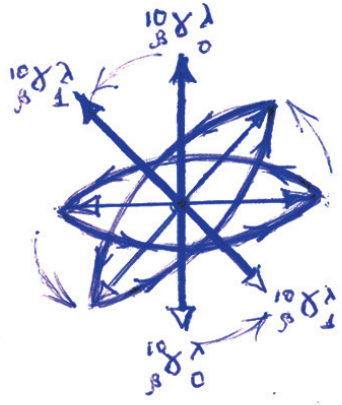
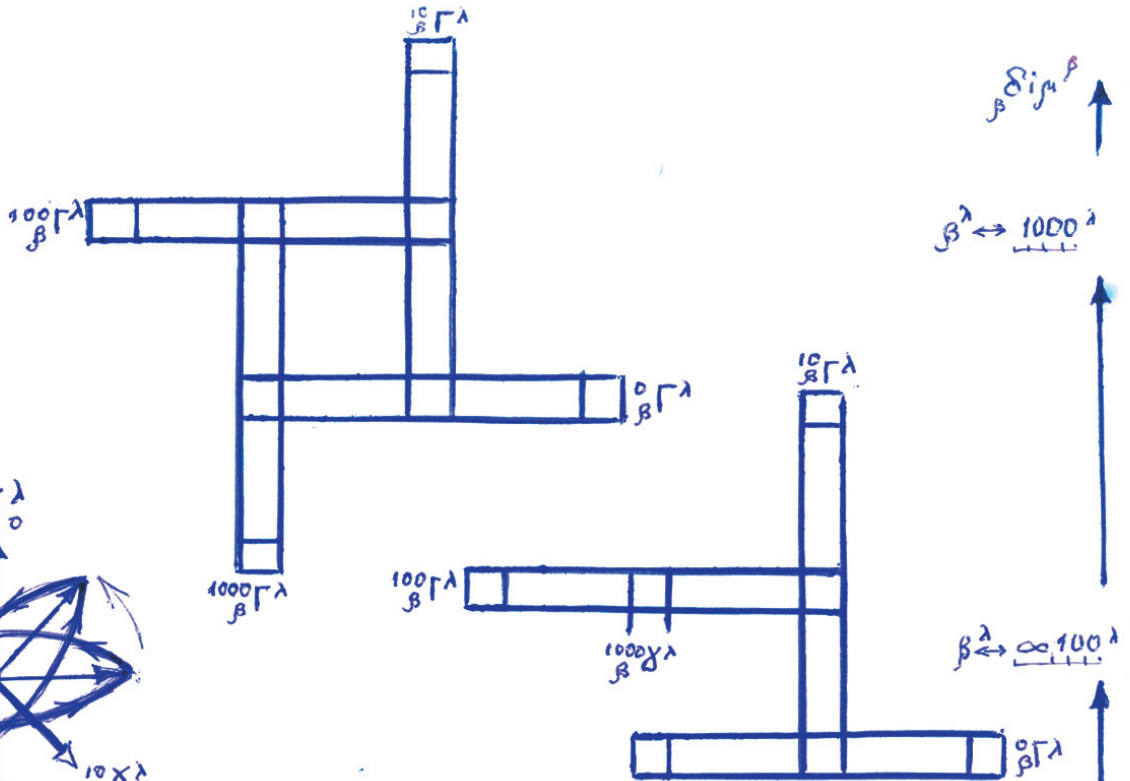
Малымасці адзіны туману  $\beta_\tau^\lambda$  як улады ў  $A^\lambda$  богаецца за малымасці  $\alpha_\tau^\lambda$ :  $\alpha_\tau^\lambda$  сцягвае чэйныя канцы стражак макаў  $\{ \beta_\tau^\lambda \}$ , а  $\beta_\tau^\lambda$  - і чэйныя і светлыя канцы (але  $\beta_\tau^\lambda$  адзіны мехалон атрымае ад крыніцы  $\omega_\tau^\lambda$ , а  $\alpha_\tau^\lambda$  сцягвае мехалоні сама).

Хімероны  $\{ \beta \text{Хем}_\tau^\lambda \}$  - каховыя рэгі, які змяняюцца і знікаюць у кантактах  $\beta_\tau^\lambda$  хімічнага еіотэм поля  $\beta^\lambda$ . Хімероны - сігнал улады ў механізмах абмену  $\beta_\tau^\lambda$  як бядзе да ўзнікнення руху складанні  $\beta \rightarrow \omega$  ў свеце  $A^\lambda$  і змяненні хімероннай улады  $\beta \rightarrow \omega$  тутаральную  $\{ \beta \alpha_\tau^\lambda \}$  і татальную  $\{ \omega_\tau^\lambda \}$ .

Негатроны (электроны)  $-\omega_\tau^\lambda$  - крыніца новага поля ў  $A^\lambda$  - рэхавае натуральнае палая тэхнічных сістэм  $\{ \omega_\tau^\lambda \}$ . Дзякуючы ім рэгі  $\sigma \tau \chi_\tau^\lambda$  і хімерон  $-\text{Хем}_\tau^\lambda$  існуюць у сток. Такім чынам рэгі  $\tau \chi_\tau^\lambda$  (крыніца хімерона  $-\omega_\tau^\lambda$ ) даццяваецца да рэгі  $\sigma \tau \chi_\tau^\lambda$  і ахутвае яе гэтым хімеронам як сігналам улады. У выніку ўзнікае звяз  $\{ \omega_\tau^\lambda, \beta \omega_\tau^\lambda \}$  - новае еіотэм - хіма  $\lambda$  (хімеронна-тэхнічны звяз, атач) і новае поле - поле малміта.

Хімерон  $+\text{Хем}_\tau^\lambda$  вышывае рух асветы рэгаў далёкіх ад яго крыніцы і мае многавую эксец. Стокі фатоноў іх хемалонамі (іх уласнымі палаямі тумана) - аснове працэса апрацоўкі відаў як чуткаў. Гэты працэс апінуюцца на мяжы гадзіны загадаў  $+\lambda$  і гадзіны прапановы  $+\lambda$  у свеце  $A^\lambda$ .

$\alpha^\lambda | \beta \Gamma^\lambda$   
 $\lambda \leftrightarrow X^\lambda$



(схема  $\alpha^\lambda | \beta \Gamma^\lambda$  - рух узвигу мернаєці  $\beta \delta i \mu^\lambda$  у метак великого кута ( $\beta$ -анга).  $\beta \delta i \mu^\lambda$   
 (стыкі  $\beta \delta \lambda$  адзінак туману  $\beta^\lambda$  - куты (зукі) рознай мернаєці. Гадзіннік  $10 \Gamma^\lambda$  - закон  
 змены меры  $10 \delta \lambda$  кутаў (іх магнітуды) у метак мернаєці  $\beta \delta i \mu^\lambda \leftrightarrow \infty 10^\lambda$ . Гэты закон  
 працуе і ў метак мернаєцей  $\beta \delta i \mu^\lambda \leftrightarrow \infty 100^\lambda$  і  $\delta i \mu^\lambda \leftrightarrow 1000^\lambda$ . Вялікі кут узнікае ў  
 між выкасту (лінотамня) крнізнай адзіны  $0 \omega^\lambda$  у яе месцы. Гэта месца і  
 зукі  $\beta \Gamma^\lambda$  з'яе сімвалы (відны) апынаюцца ў памяці ўсіх сістэм  $\{ \omega^\lambda \}$  ноль  $0^\lambda$   
 гадзіннік  $\beta \Gamma^\lambda$  і лічбальнік  $\beta \Gamma^\lambda$  як месцы сістэм  $\{ \omega^\lambda \}$  узгадняюць іх узв'язкі.



Mathematical definition of number codes  $\Lambda^3$  allows to carry out theoretical tasks too. Among them is well known task: to define all  $\{\psi\}$  in the note

(\*)  $\psi^\nu + \chi^\nu \leftrightarrow \varphi^\nu$ , where  $\nu, \psi, \chi, \varphi$  - integer numbers.

In that case the numbers  $\psi, \chi, \varphi$  may be ordered, For instance:  $\psi \leq \chi < \varphi$  or  $\chi \leftrightarrow \psi + \delta$ ,  $\varphi \leftrightarrow \psi + (\delta + \delta)$ ,  $\delta \neq \psi, \delta$  - integer, if  $\psi$  is the base of number code  $\Lambda^3 | \psi$ , then  $\psi \leftrightarrow 10$  and

$$(*) \leftrightarrow \begin{matrix} \overbrace{100\dots 0}^\psi & \leftrightarrow 10^\nu & \leftrightarrow \psi^\nu & \leftrightarrow \psi^\nu \\ \underbrace{\psi(\lambda_\nu, \dots, \lambda_0)}_\chi & \leftrightarrow (10 + \delta)^\nu & \leftrightarrow (\psi + \delta)^\nu & \leftrightarrow \chi^\nu \\ \underbrace{\varphi(\lambda_\nu, \dots, \lambda_0)}_\varphi & \leftrightarrow (10 + (\delta + \delta))^\nu & \leftrightarrow (\psi + (\delta + \delta))^\nu & \leftrightarrow \varphi^\nu \end{matrix}$$

The figures  $\chi(\lambda_\nu) \leftrightarrow \varphi(\lambda_\nu)$ ,  $\nu \leftrightarrow 0, \dots, \nu-1$ , and it is right for the binomial members, ~~that is in~~ with abilities of

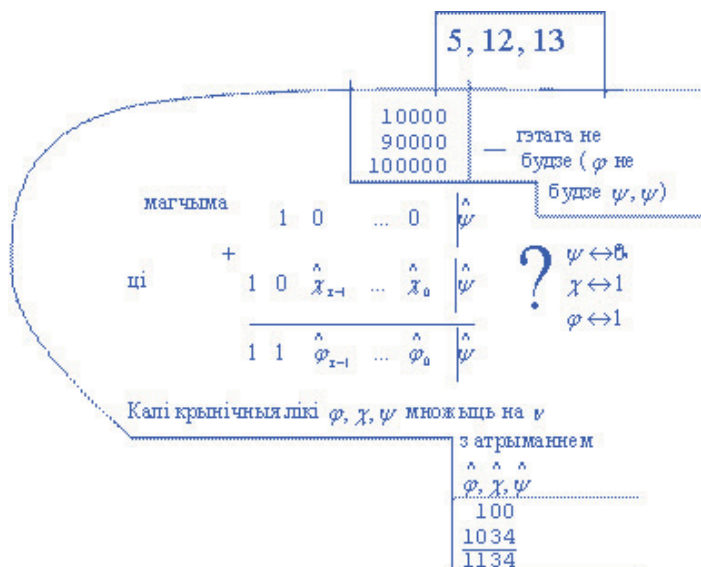
$$(\psi + \delta)^\nu \leftrightarrow \psi^\nu + \nu \cdot \delta \cdot \psi^{\nu-1} + \dots + \delta^\nu \cdot \psi^0$$

(All binomial members are able to have abilities of hierarchical numbers) That is  $(\delta + \delta)^\nu \leftrightarrow \delta + \psi$  so in fact send

$$\nu \cdot (\delta + \delta) \leftrightarrow \nu \cdot \delta + \psi - 1 \quad (\forall \nu \leftrightarrow 2, \dots)$$

$$\Rightarrow (\delta + \delta)^\nu \leftrightarrow \delta^\nu + \nu \cdot \delta + 1 \rightarrow \nu \leftrightarrow 2$$

<sup>1</sup> Дрэнна чытэльная частка даказу тэарэмы са стар.83:



## Частка 2. СВЕТ

# HIERARCHICAL MECHANICS OF NATURAL SYSTEMS<sup>1</sup>

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**Abstract:** The paper suggests the new mathematical images (definitions) of the lowest natural strata (natural fields&things including chemical system) by means of hierarchical mathematics  $A^\lambda$  and mechanics  $P^\lambda$ . The definitions meet all requirements of practical cybernetics (design&learning). The images of known natural fields (fields of chargers magnetic, gravitational, nuclear links) and new one (field of hierarchical haze) are stages of dimensions growth of one original field in process of level increasing. Natural systems (protons, electrons, positrons, photons and other) contain these stages and change them. The paper marks new horizons of practical mechanics.

**Keywords:** hierarchical multilevel system, mechanics, cybernetics, natural systems&fields.

## 1 THE TASK

Hierarchical mathematics  $A^\lambda$  (Novikava et al., 1998) originated by works of M. Mesarovic and Y. Takahara (Mesarovich et al., 1970; Mesarovich and Takahara, 1975) must define any systems and order all directions of science (areas of knowledge) by simple schemes (images, figures) linked in general scheme with new (hazy) horizons of knowledge, and in agreement with the requirements of practical cybernetics (design&learning).

The area of knowledge about natural fields&systems (including chemical ones), being a reason of many mathematical theories (and a range of their long&rich practice) looks now as the most ordered among scientific directions.

However its existing order is a set of odd directions incohered with practical cybernetics where any system image must link:

- changes of system contents (its lower strata);
- its activity as whole thing in its own stratum (among like systems) and one in its holding systems (its higher strata);
- its changing signs in higher strata (which are defined by system activity and define its life cycle).

The main laws of this area, in fact, ban the named cybernetics links. When (in agreement with these laws) any system must keep its rest or straight-line uniform motion till an interaction with other system (this interaction will be equal to zero), it means that any changes in system contents can not change its activity in its own and higher strata. And higher strata can not arise in that case at all.

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Other general laws of considered area do not allow many known facts and can not connect existent descriptions of natural systems&fields.

The paper suggests new way of natural systems&fields definition by means of hierarchical mechanics  $P^\lambda$ , arithmetic  $\Lambda^\lambda$  and other strata of hierarchical mathematics  $A^\lambda$ .

## 2 MATHEMATICAL SYMBOL OF HIERARCHICAL SYSTEM

Mathematical symbol  $A^\lambda$  of hierarchical system has now two main images –  ${}^x\alpha^\lambda$  and  ${}^+\alpha^\lambda$  (fig.1).  ${}^x\alpha^\lambda$  and  ${}^+\alpha^\lambda$  define one statute hierarchical system with mechanism of level increasing.

$$\begin{aligned}
 {}^x\alpha^\lambda: & \quad A^\lambda \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \\ \rho \end{matrix} \begin{matrix} \lambda \\ A \\ \sigma \end{matrix} \right\} \xrightarrow[\rho]{A^\lambda} \beta \\
 \Lambda^\lambda & \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \\ \rho \end{matrix} \begin{matrix} \lambda \\ \Lambda \\ \sigma \end{matrix} \right\} \xrightarrow[\rho]{\Lambda^\lambda} \beta & \quad P^\lambda \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \\ \rho \end{matrix} \begin{matrix} \lambda \\ P \\ \sigma \end{matrix} \right\} \xrightarrow[\rho]{P^\lambda} \beta & \quad \Gamma^\lambda \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \\ \rho \end{matrix} \begin{matrix} \lambda \\ \Gamma \\ \sigma \end{matrix} \right\} \xrightarrow[\rho]{\Gamma^\lambda} \beta \\
 \Omega^\lambda & \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \\ \rho \end{matrix} \begin{matrix} \lambda \\ \Omega \\ \sigma \end{matrix} \right\} \xrightarrow[\rho]{\Omega^\lambda} \beta & \quad \Sigma^\lambda \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \\ \rho \end{matrix} \begin{matrix} \lambda \\ \Sigma \\ \sigma \end{matrix} \right\} \xrightarrow[\rho]{\Sigma^\lambda} \beta & \quad B^\lambda \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \\ \rho \end{matrix} \begin{matrix} \lambda \\ B \\ \sigma \end{matrix} \right\} \xrightarrow[\rho]{B^\lambda} \beta \\
 A^\beta & \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} ? \\ \omega \\ \rho \end{matrix} \begin{matrix} \lambda \\ A \\ \sigma \end{matrix} \right\} \xrightarrow[\rho]{A^\beta} ?
 \end{aligned}$$

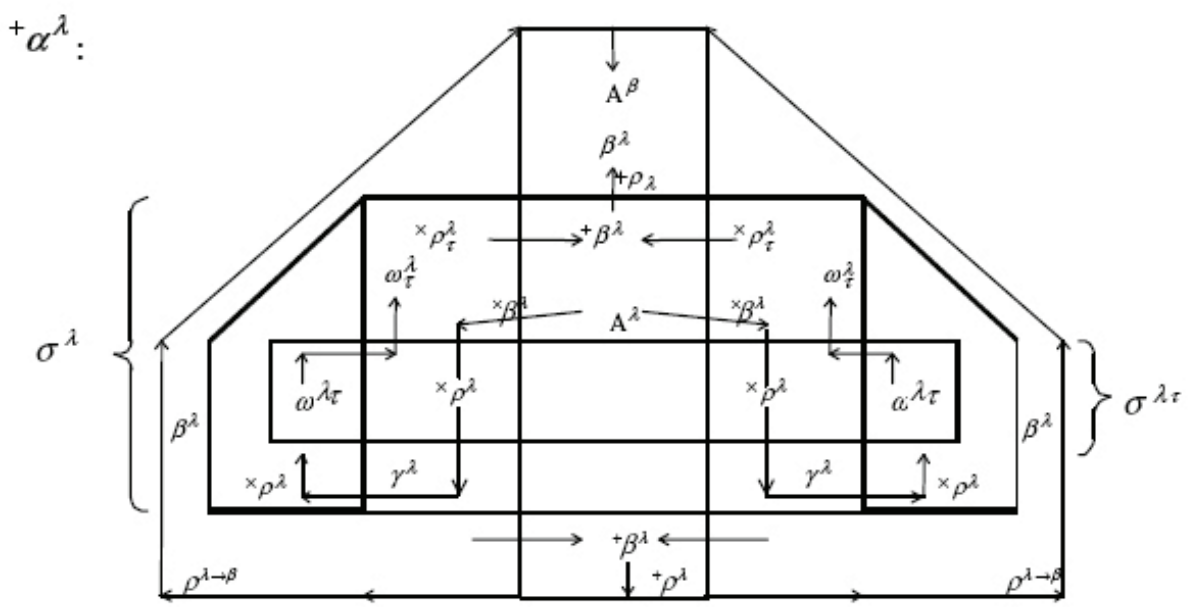


Fig.1 Mathematical images  ${}^x\alpha^\lambda$  and  ${}^+\alpha^\lambda$  of hierarchical systems.



In the way of level increasing (fig.1) the system  $A^\lambda$  is original authority (sway) of time  $\lambda$  ( $A^\lambda \leftrightarrow \omega_0^\lambda$ ).  $A^\lambda$  is included into contents of all its lower strata  $\sigma^\lambda \leftrightarrow \{\omega_\tau^\lambda\}$ . Then it is multiplied by act  $\times \rho^\lambda: \omega_0^\lambda \rightarrow \sigma^\lambda \leftrightarrow \{\omega_\tau^\lambda\}$  and is turned into plural number  $\sigma^\lambda$  of technical (ordinary) systems  $\{\omega_\tau^\lambda\}$ , which own all its abilities. At first  $\sigma^\lambda$  is hazy field with chimerical order  $\gamma_\sigma^\lambda \leftrightarrow \infty^\lambda$ . All systems  $\{\omega_\tau^\lambda\}$  turn their natural (lower) strata  $\{\sigma^{\lambda\tau}\}$  into their own hazy areas  $\{\beta_\tau^\lambda\}$ . Exchange of hazy areas  $\{\beta_\tau^\lambda\}$  in process  $\div \rho_{\sigma \rightarrow \omega}^{\lambda \rightarrow \beta}$  lead to their ordering (their dimensions growth). Thanks to that the new order  ${}^\beta \gamma$  grows in the whole hazy field  $\beta^\lambda$  where meta systems  $A^\beta$  (meta authority of time  $\lambda$  and original sway of time  $\beta$ ) arises.

Own name of  $A^\lambda$  in natural language is aed, and strata names are:

$\Lambda, \lambda$  – level (lik, angle, hierarchical number, time&space sign, range, ...);

$P, \rho$  – act (turn, changing, process, technology, ...);

$\Gamma, \gamma$  – link (connection, measure, characteristic, law, statute, order,..);

$\Omega, \omega$  – single system (thing, state, unit, detail, ...);

$\Sigma, \sigma$  – many systems (plural number, field, contents, construction, ...);

$B, \beta$  – hierarchical haze (vagueness, chaos, aim, task, ...), new (meta) strata;

$A, \alpha$  – authority (symbol system, sway, ...);

$A^\lambda$  – original sway of level  $\lambda$ ,  $A^\beta$  – new, meta authority of time  $\lambda$ , origin of higher level  $\beta$ .

$A^\lambda$  strata are changed in process  $\rho^{\lambda \rightarrow \beta}$ : act proves to be link, single system – plural number (and new single system again), time is turned into thing, haze – into order and then – into new haze, and the like. Since that their names are changed too. Owing to strata links (fig.2) any changes of one stratum are owned by other ones.

$\Gamma_\alpha$ :

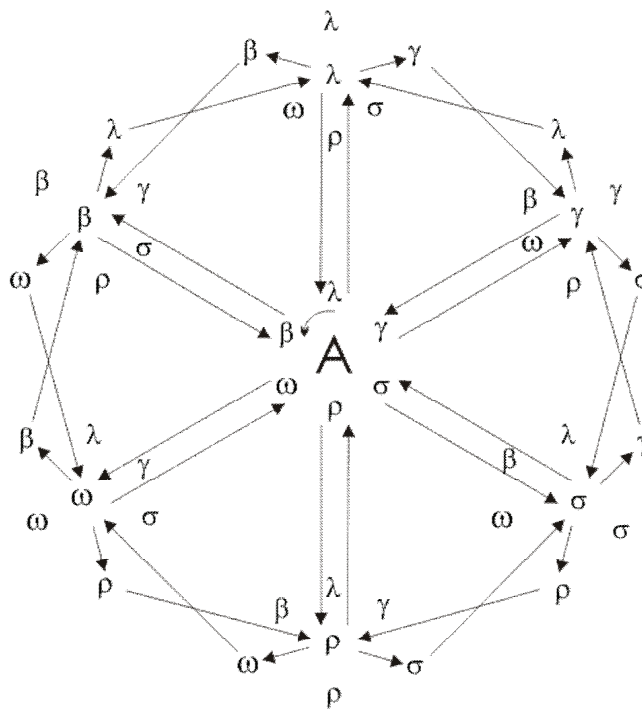


Fig.2  $A^\lambda$  strata links  $\Gamma_\alpha$  in process  $\rho^{\lambda \rightarrow \beta}$ .

### 3 MECHANICS OF HIERARCHICAL SYSTEMS.

Mechanics  $P^\lambda$  of hierarchical systems is process  $\rho^{\lambda \rightarrow \beta}$ . It changes both natural systems&fields and mathematical symbols. These cohered changes are described together in the paper (with aim to abridge its text). And near by mathematical schemes the habitual graphical images are included in text. Unlike mathematical figures these images can not be the members of acts  $(+)^{\lambda}$  and  $(\times)^{\lambda}$ . But they answer to exact schemes and allow to connect new mathematics and existent means.

Any level (time)  $\lambda$  in hierarchical systems is defined in process  $\rho^{\lambda \rightarrow \beta}$  by its:

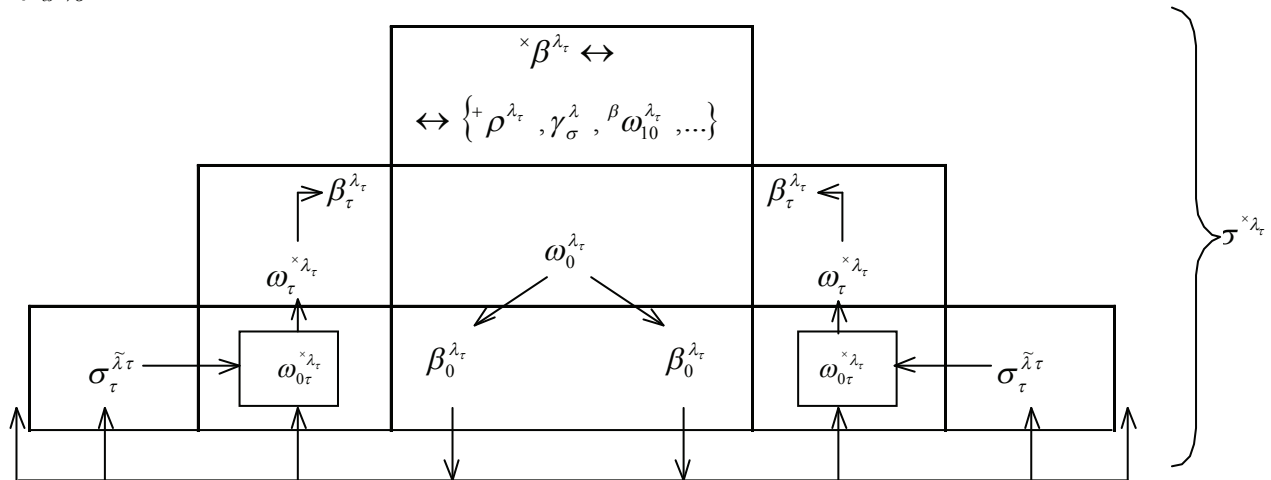
- 2) natural history  $\rho^{\lambda_\tau}$  in earlier times  $\lambda_\tau$  ( $\lambda_\tau \rightarrow \lambda$ ) till time  $\lambda$  arising;
- 3) own history  $\rho^\lambda \leftrightarrow \{\times \rho^\lambda, + \rho^\lambda\}$  where:
  - original sway  $\omega_0^\lambda$  of time  $\lambda$  is multiplied by act  $\times \rho_{\omega \rightarrow \sigma}^\lambda$  (in time  $\times \lambda$ ), and it is turned into field  $\sigma^\lambda$  of ordinary (technical) systems  $\omega_\tau^\lambda$  able to grow hierarchical haze  $\beta^\lambda$  of time  $\lambda$ ;
  - technical things  $\omega_\tau^\lambda$  in field  $\sigma^\lambda$  exchange their hazy areas  $\beta_\tau^\lambda$  by links  $\gamma_\tau^\lambda$ , order them, and define their leading unit  ${}^\beta \omega_{10}^{\lambda_\tau}$  and then meta authority  $\omega_0^\beta$  in process  ${}^+ \rho_{\sigma \rightarrow \omega}^{\lambda \rightarrow \beta}$  of time  ${}^+ \lambda$ ;
- 4) new history  $\rho^\beta$  when the highest sway  $\omega_0^\beta$  changes the contents of all authorized systems (systems of time  $\lambda$ ) by signals of new time  $\beta$ .

In agreement with that the following text is organized as a range of stages: natural, own and new history of time  $\lambda$ .

#### 3.1 GENERAL FIGURES OF THE PROCESS $\rho^{\lambda_\tau}$ .

Natural history  $\rho^{\lambda_\tau} \leftrightarrow \{\times \rho^{\lambda_\tau}, + \rho^{\lambda_\tau}\}$ ,  $\lambda_\tau \leftrightarrow (\times \lambda_\tau \rightarrow + \lambda_\tau)$  of level  $\lambda$  begins in time  $\times \lambda_\tau$  when original sway (initial system) of time  $\lambda_\tau$  (earlier then  $\lambda$ , lower stratum of  $\lambda$ ) is multiplied by act

$$\times \rho_{\omega \rightarrow \sigma}^{\lambda_\tau} : \omega_0^{\lambda_\tau} \rightarrow \sigma^{\lambda_\tau} :$$



Habitual name of the field  $\sigma^{\lambda\tau}$  in technical science&practice is ether, and systems  $\omega_{\tau}^{\lambda\tau}$  are ether things. Ether  $\sigma^{\lambda\tau}$  is zero – field in measures of new (arising) time  $\lambda$  since ether units  $\omega_{\tau}^{\lambda\tau}$  and the whole field  $\sigma^{\lambda\tau}$  at fist have not characteristics of new time  $\lambda$ .

Directly after act  $\times\rho^{\lambda\tau}$  ether field  $\sigma^{\lambda\tau}$  is set of odd ordinary systems  $\omega_{\tau}^{\lambda\tau}$  with general link  $\gamma_{0\sigma}^{\lambda\tau} \leftrightarrow \omega_0^{\lambda\tau}$  (signal of original sway in time  $\lambda_{\tau} \leftrightarrow 0^{\lambda\tau}$ ) and dark haze  $\gamma^{\lambda\tau} \leftrightarrow \infty^{\lambda\tau}$  in the links  $\gamma_{\sigma}^{\lambda\tau}$  of time  $\lambda_{\tau} \leftrightarrow \sigma^{\lambda\tau}$ :

$$\sigma^{\lambda\tau} \leftrightarrow \left\{ \left\{ \omega_{\tau}^{\lambda\tau} \right\}, \gamma_{0\sigma}^{\lambda\tau} \leftrightarrow \omega_0^{\lambda\tau}, \gamma_{\sigma}^{\lambda\tau} \leftrightarrow \infty^{\lambda\tau} (\tau \leftrightarrow 0^{\lambda\tau}) \right\}$$

$$\omega_{\tau}^{\lambda\tau} \leftrightarrow \left\{ \omega_0^{\lambda\tau}, \sigma^{\tilde{\lambda}\tau} \right\}_{\tau} \leftrightarrow \left\{ \omega_0^{\lambda\tau}, \left\{ \omega_i^{\tilde{\lambda}\tau} \right\} \right\}_{\tau}$$

Ether systems  $\omega_{\tau}^{\lambda\tau}$  hold lower strata  $\left\{ \omega_0^{\tilde{\lambda}\tau} \right\}_{\tau} \leftrightarrow \sigma_{\tau}^{\tilde{\lambda}\tau}$  - old scales (old fields) of time  $\tilde{\lambda}_{\tau}$  earlier then  $\lambda_{\tau}$  ( $\tilde{\lambda}_{\tau} \leftrightarrow \lambda_{\tau}$ ), and they are authorized by sway systems  $\omega_0^{\lambda\tau}$  of time  $\lambda_{\tau}$  (it is chimerical order (nominal scale) of the whole ether field  $\sigma^{\lambda\tau}$ ).

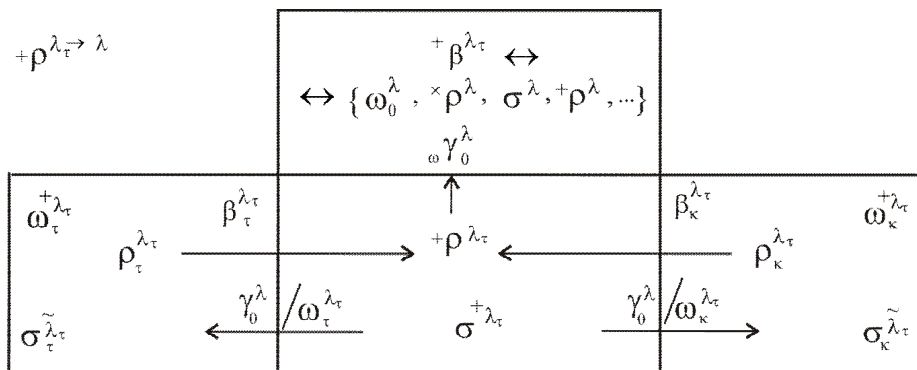
All sway units  $\omega_0^{\lambda\tau}$  belong to original authority  $\omega_0^{\lambda\tau}$  (hidden after its multiplying (dividing)). They are similar in all ether things  $\omega_{\tau}^{\lambda\tau}$  and can not be members of exchange  $\gamma_{\sigma}^{\lambda\tau}, \lambda_{\tau} \leftrightarrow 0^{\lambda\tau}$ .

However any technical ether thing  $\omega_{\tau}^{\lambda\tau}$  owns all might of its original  $\omega_{\beta}^{\lambda\tau}$ . It orders its old scales  $\sigma_{\tau}^{\tilde{\lambda}\tau}$  by total (mechanical) order  $\gamma_{0\sigma}^{\lambda\tau}$  and unites them by its act  $+\rho_{\tau}^{\tilde{\lambda}\tau \rightarrow \lambda\tau}$ . Then in act  $+\rho_{\tau}^{\lambda\tau}$ , the system  $\omega_{\tau}^{\lambda\tau}$  multiplies its sway  $\omega_0^{\lambda\tau}$  - it turns lower systems  $\omega_{i\tau}^{\tilde{\lambda}\tau}$  of its old field into new thing  $\beta_{i\tau}^{\lambda\tau}$ .

They are similar to  $\omega_0^{\lambda\tau}$  and have new (hazy) measures of metatime (arising time)  $\lambda$ . After that the system  $\omega_{\tau}^{\lambda\tau}$  begins process  $+\rho_{\tau}^{\lambda\tau \rightarrow \lambda}$  in its own chimerical field  $\left\{ \beta_i^{\lambda\tau} \right\}_{\tau}$ . It marks the things  $\beta_{i\tau}^{\lambda\tau}$  by sings of its own authority in agreement with times of their arising and stows them in scales (layers) of its own hazy zone – the earliest layers of haze is the nearest to  $\omega_0^{\lambda\tau}$ :

$$\left\{ +\rho_{\tau}^{\tilde{\lambda}\tau \rightarrow \lambda\tau}, \times\rho^{\lambda\tau}, +\rho^{\lambda\tau} \rightarrow \beta^{\lambda\tau} \right\} \rho_{\tau}^{\lambda\tau} : \left\{ \omega_0^{\lambda\tau}, \sigma^{\tilde{\lambda}\tau} \right\}_{\tau} \rightarrow \left\{ \omega_0^{\lambda\tau}, \left\{ \beta_i^{\tilde{\lambda}\tau} \right\} \right\}_{\tau} \leftrightarrow \omega_{\tau}^{+\lambda\tau}$$

In this way the old field  $\sigma_{\tau}^{\tilde{\lambda}\tau}$  wanes – it is turned into  $\left\{ \beta_i^{\lambda\tau} \right\}_{\tau}$  – new chimerical scale of system  $\omega_{\tau}^{\lambda\tau}$ . ether things  $\omega_{\tau}^{\lambda\tau}$  now may be ranged in general ether field  $\sigma^{\lambda\tau}$  in agreement with magnitudes and orders of their hazy areas. (It is ordinal scale). New zones  $\beta_{\tau}^{\lambda\tau}$  are worthy to be exchanged. It means that time  $\times\lambda_{\tau}$  ends and general process  $+\rho_{\sigma \rightarrow \omega}^{\lambda\tau \rightarrow \lambda}$  begins in  $\sigma^{\lambda\tau}$  together with time of uniting  $+\lambda_{\tau}$ .



Act  ${}^+ \rho_{\sigma \rightarrow \omega}^{\lambda_\tau \rightarrow \lambda}$  of time  ${}^+ \lambda_\tau$  connects ether things  $\omega_\tau^{\lambda_\tau}$  by links  $\gamma_\sigma^{\lambda_\tau}$  with new measures  ${}_\omega \beta^{\lambda_\tau}$  of their arising meta sway  $\omega_0^\lambda$ :

$$\sigma^{\lambda_\tau} \leftrightarrow \left\{ \left\{ \omega_\tau^{\lambda_\tau} \right\}, \gamma_\sigma^{\lambda_\tau} \rightarrow {}_\omega \gamma_0^\lambda \right\}$$

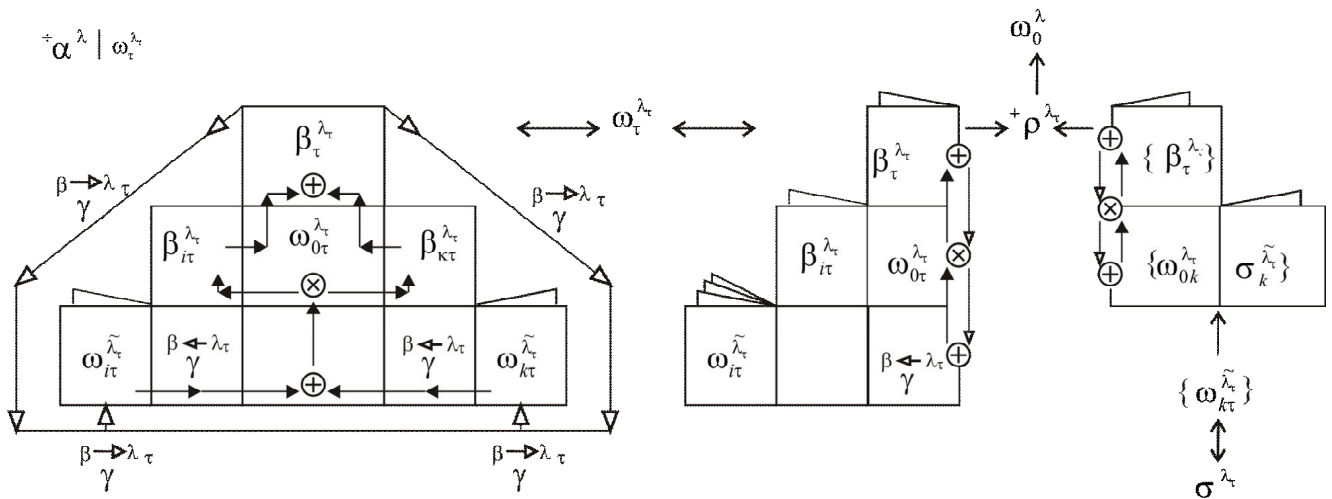
Dimensions (measures)  $\beta_\tau^{\lambda_\tau}$  of  $\omega_0^\lambda$  mark new state of ether field  $\sigma^{\lambda_\tau}$  (its new order in metrical scale of meta time  $\lambda$ ).

Dimensions grow within ether things too – by their own means and by means of their meta authority. (It has direct contacts with all its natural strata, and it is able to be included in the smallest systems as their new dimension (ort, measure of organization)). The most significant ether things (leading systems)  $\omega_{10}^{\lambda_\tau}$  have the best organization of their hazy areas  $\beta_{10}^{\lambda_\tau}$  (among  $\omega_k^{\lambda_\tau}$  with  $\beta_k^{\lambda_\tau}$  where  $\kappa^{\lambda_\tau} < 10^{\lambda_\tau}$ ). owing to that the thing  $\omega_{10}^{\lambda_\tau}$  proves to be in mainstream to its (hazy) sway. It is ordered by new signals  $\beta \gamma^{\lambda_\tau}$  and is turned by act  ${}^+ \rho_{\sigma \rightarrow \omega}^{\lambda_\tau \rightarrow \lambda}$  into this sway – original authority  $\omega_0^\lambda$  of new time  $\lambda$ .

Then process  ${}^\times \rho_{\omega \rightarrow \sigma}^\lambda$  will lead to the simplest natural systems (technical in measures of their original authority) – protons, electrons, neutrino, photons and other. Their activity will change old ether  $\sigma^{\lambda_\tau}$  and turn it into fields of charges, magnetic, gravitational, nuclear links, and new one – field of hierarchical hazy  $\beta^\lambda$ .

### 3.2 TECHNICAL SYSTEM $\omega_\tau^{\lambda_\tau}$ : WAY TO AUTHORITY

Way  $\beta \rho_\tau^{\lambda_\tau} : \omega_\tau^{\lambda_\tau} \rightarrow \omega_{10}^{\lambda_\tau} \rightarrow \omega_0^\lambda$  of one technical thing  $\omega_\tau^{\lambda_\tau}$  with ordinary ether system to leading one  $\omega_{10}^{\lambda_\tau}$  of time  $\lambda_\tau$  and to original authority  $\omega_0^\lambda$  of new time  $\lambda$  is the main in hierarchical mechanics of natural fields&systems. It is imaged below as way of dimensions growth in hierarchical numbers  $\lambda^\lambda$  of arithmetic  $\Lambda^\lambda$ . Hierarchical numbers are symbols of turns of following schemes  $\left\{ {}^+ \alpha^\lambda \mid \omega_\tau^{\lambda_\tau} \right\}$ .

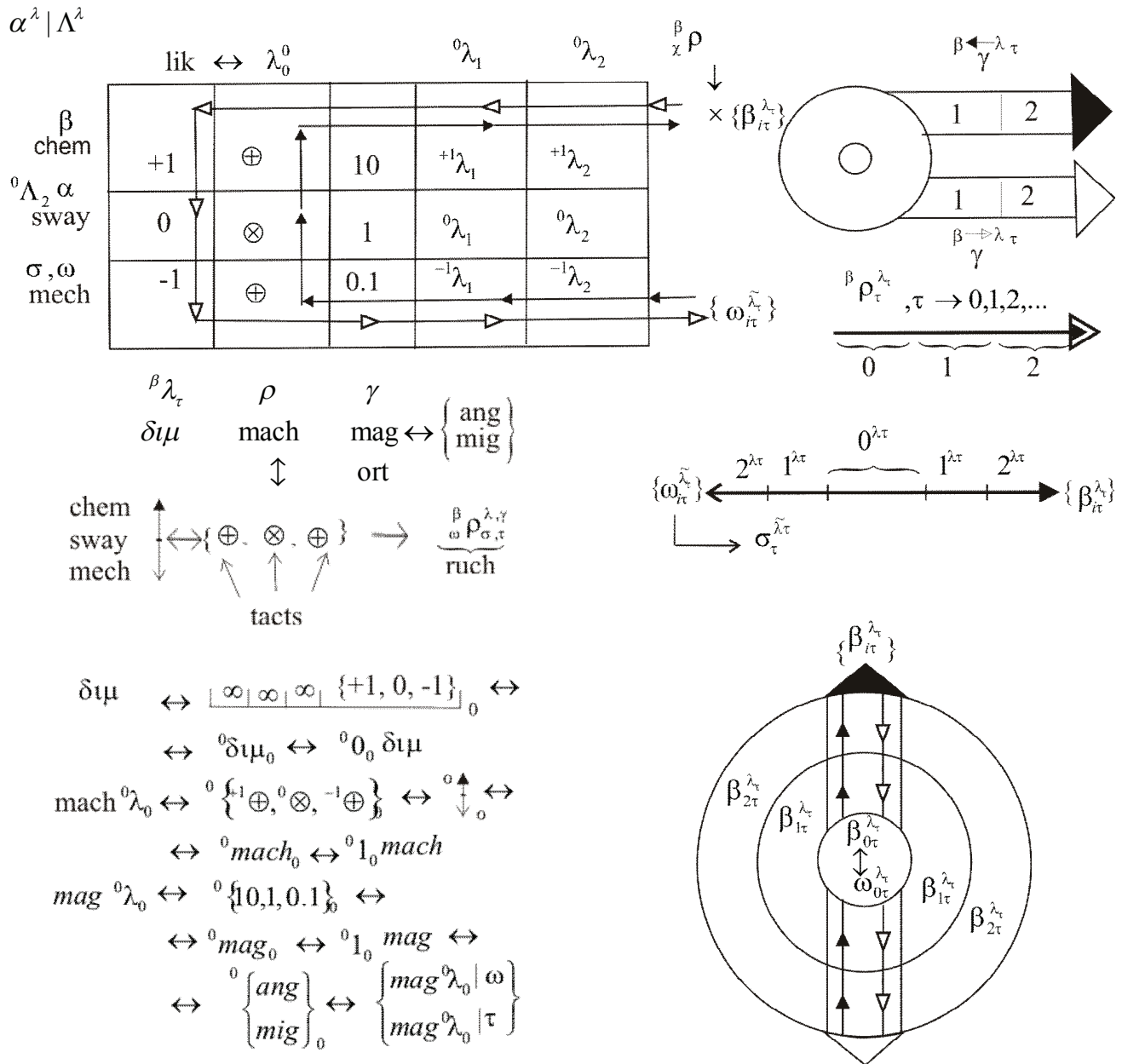


Bend on angle of right image of  $\omega_\tau^{\lambda_\tau}$  in scheme  $\alpha^\lambda / \omega_\tau^{\lambda_\tau}$  allows to organize its contacts with like schemes  $\{\omega_k^{\lambda_k}\}$  by their mainstreams (hierarchical systems are linked by their sway zones):

$$\{\beta \gamma^{\lambda_\tau}\} \leftrightarrow \{\oplus \xleftrightarrow{\tilde{\lambda}_\tau} \otimes \xleftrightarrow{\lambda_\tau} \oplus\}_\tau \leftrightarrow {}^\beta \rho_\tau^{\lambda_\tau}$$

Arrows (signals)  $\beta \tilde{\gamma}^{\lambda_\tau}$  with back ends  $\{\uparrow\}$  lead to higher scales  $\{\beta_\tau^{\lambda_\tau}\}$ .  $\beta \tilde{\gamma}^{\lambda_\tau}$  with white ends  $\{\downarrow\}$  – to lower ones –  $\{\sigma^{\tilde{\lambda}_\tau}\}$  and  $\sigma^{\lambda_\tau}$ .

Zones  $\{\oplus, \otimes, \oplus\}_\tau$  contain facts (units) of process  $\rho_\tau^{\lambda_\tau}$  in single ether thing. General way  $\rho^{\lambda_\tau \rightarrow \lambda}$  in the whole ether field  $\sigma^{\lambda_\tau}$  is imaged by linked turn of sway symbols – hierarchical numbers  $\lambda^\lambda$ .



$$\delta i \mu \leftrightarrow \underbrace{|\infty| \infty | \infty |}_{0} \{+1, 0, -1\}_0 \leftrightarrow$$

$$\leftrightarrow {}^0 \delta i \mu_0 \leftrightarrow {}^0 0_0 \delta i \mu$$

$$\text{mach } {}^0 \lambda_0 \leftrightarrow {}^0 \{\oplus, \otimes, \oplus\} \leftrightarrow {}^0 \updownarrow_0 \leftrightarrow$$

$$\leftrightarrow {}^0 \text{mach}_0 \leftrightarrow {}^0 1_0 \text{mach}$$

$$\text{mag } {}^0 \lambda_0 \leftrightarrow {}^0 \{10, 1, 0.1\}_0 \leftrightarrow$$

$$\leftrightarrow {}^0 \text{mag}_0 \leftrightarrow {}^0 1_0 \text{mag} \leftrightarrow$$

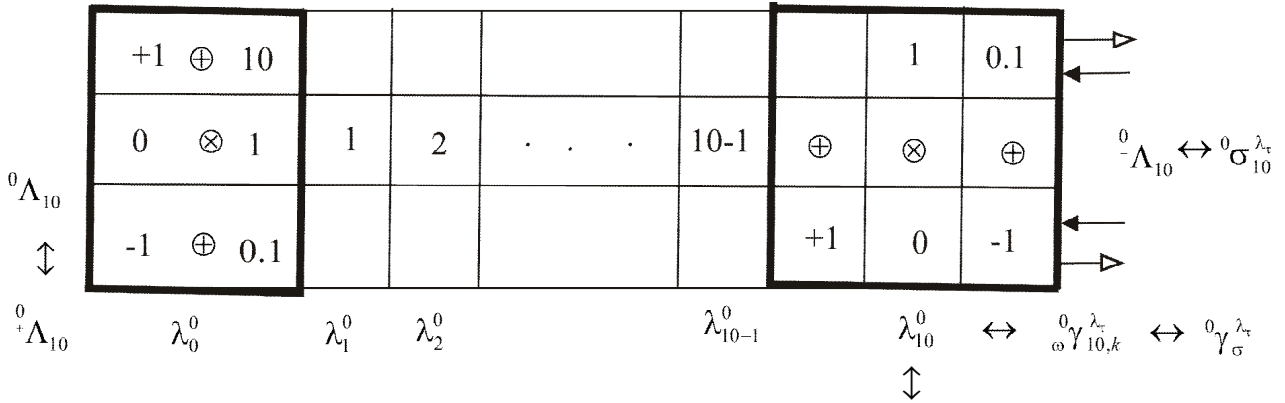
$$\leftrightarrow {}^0 \begin{cases} \text{ang} \\ \text{mig} \end{cases} \leftrightarrow \begin{cases} \text{mag } {}^0 \lambda_0 | \omega \\ \text{mag } {}^0 \lambda_0 | \tau \end{cases}$$

$${}^0\lambda_1 \leftrightarrow {}^0\lambda_0, {}^0\lambda_2 \leftrightarrow {}^0\lambda_0 + {}^0\lambda_1, \dots, {}^0\lambda_{10} \leftrightarrow {}^0\lambda_0 + {}^0\lambda_{(10-1)}$$

$$\{^0\tau\} \leftrightarrow {}^0\{0,1,\dots,10\}_0 \leftrightarrow {}^0\{\lambda_0, \lambda_0, \dots, \lambda_{10}\}_0 | \tau$$

$${}^0ruch_0 \leftrightarrow {}^0ang / {}^0mig_0 \leftrightarrow {}^0\{ang / mig\}_0$$

$${}^0mach_0 / {}^0mig_0 \leftrightarrow {}^0\{mach / mig\}_0$$



$$mag^0\lambda_{10} \rightarrow mag^{10}\lambda_0 \leftrightarrow$$

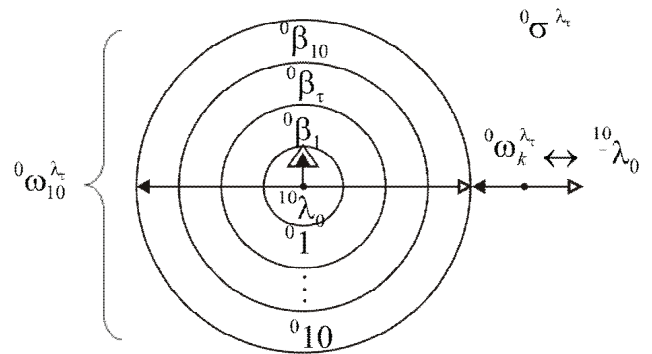
$$\leftrightarrow {}^{10}\{0,1,0.1\}_0$$

$$[ \begin{matrix} \uparrow \\ \downarrow \\ \uparrow \\ \downarrow \end{matrix} \times \begin{matrix} \uparrow \\ \downarrow \\ \uparrow \\ \downarrow \end{matrix} ] \leftrightarrow [ \begin{matrix} \uparrow \\ \downarrow \\ \uparrow \\ \downarrow \end{matrix} \times \begin{matrix} \uparrow \\ \downarrow \\ \uparrow \\ \downarrow \end{matrix} ] \leftrightarrow \begin{matrix} \uparrow \\ \downarrow \\ \uparrow \\ \downarrow \end{matrix} \leftrightarrow {}^{10}\lambda_0$$

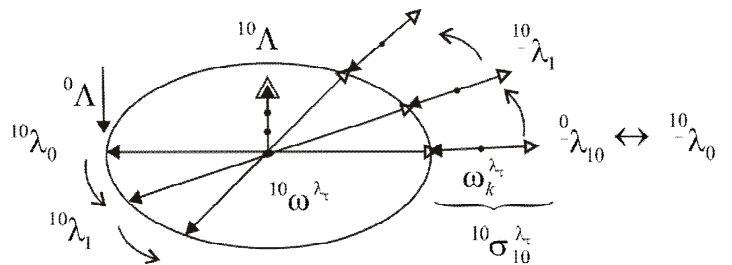
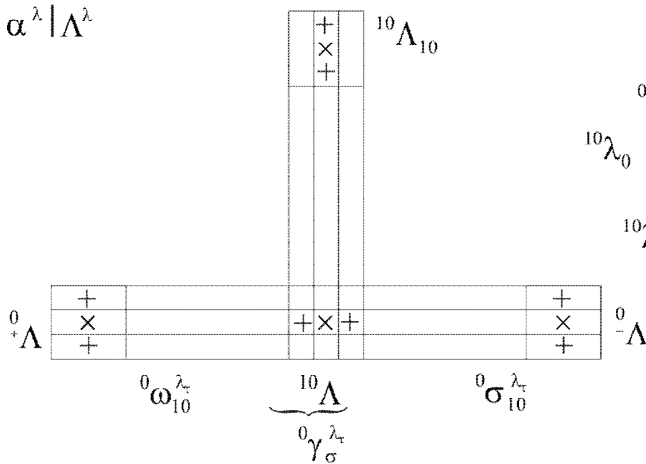
$$\delta i \mu^{10}\lambda_0 \leftrightarrow$$

$$\leftrightarrow \lfloor \infty \rfloor \lfloor \infty \rfloor \{+1, 0, \bar{1}0\}, \{+1, 0, \bar{1}0\} \leftrightarrow$$

$$\leftrightarrow 10\delta i \mu_0 \leftrightarrow 10\delta i \mu$$



$$\alpha^\lambda | \Lambda^\lambda$$









Owing to that the arithmetical field  $\{\beta\Lambda\}$  is at the same time geometrical one – system of  $\beta\text{orts}_\tau$  (ordinates, orders)  $\{\beta\Gamma\}$ ,  $\{\beta\Gamma_\tau\}$  is strongly connected with its mechanical system  $\beta\omega_\tau$ . Any thing  $\beta\omega_\tau$  defines its own  $\beta\text{orts}_\tau$   $\{\beta\Gamma_\tau\}$  by its activity in its own contents, its contacts with like systems in  $\beta\sigma_\tau$ , and its like  $\beta\gamma_{0\tau}$ ,  $\beta^+\gamma_\tau$  with its sway.

Own scheme  $\Gamma_\alpha$  of connected orders is one of the main figures in hierarchical arithmetic:  $\Gamma_\alpha$  links the strata of authority in schemes  $\alpha^\lambda|\Lambda^\lambda$  ( $\beta\text{cons}_\tau$  in  $\{\beta\Lambda\}$  field – places of dimensions growth, gates to new horizons).

Any  $\beta\gamma_\tau$  in  $\Lambda^\lambda$  has cons:

$$\{\beta\pm 0, \beta\pm 10\}, \beta\lambda_{\tau\pm 1}, \{\beta\pm\infty\}$$

$\beta\pm 0$  and  $\beta\pm 10$  – certain cons of original sway and meta authority;

$\beta\pm\infty$  – hazy cons (of meta authority);

$\beta\lambda_{\tau\pm 1}$  – places of magnitude changing within  $\beta\text{orts}_\tau$   $\beta\Lambda_\tau \leftrightarrow \beta\Gamma_\tau$  (all hierarchical numbers, even  $0\delta i\mu$  ones, are connected hierarchical systems).

Liks  $\beta+\Lambda$  and  $\beta-\Lambda$  (system  $\beta\omega_\tau$  and its environment  $\beta\sigma_\tau$ ) in scheme  $\alpha^\lambda|\Lambda^\lambda$  have zero  $^{10}\beta 0$  in the contact  $\beta\pm 10$  or  $\beta\pm\infty$  (when their cons are hazy).

In hierarchical mathematics  $A^\lambda$ , including arithmetic  $\Lambda^\lambda$  and mechanics  $P^\lambda$ , zero  $\beta 0$  is origin of new dimension, whose measures are beyond old ones. And  $\beta 0$  is hierarchical system with all signs of  $A^\lambda$  strata (cons +10 and -10 belong to contents of  $^{10}0$ ,  $^{10}\text{mag}_0$  (magnitude of  $^{10}0$ ) is original measure of new  $^{10}\text{ort}$  (original angle) and the like).

Named ability of zero is good cohered with natural systems. It is the main reason of natural base (which contains zero as 11-th system in  $\beta(1+1/\beta)$  (or  $\beta(10+1)$ ). It allows to immerse into contents of  $0\delta i\mu$  systems, to improve arithmetical acts and many other.

Marked improvement is in product of directed  $\beta\text{lik}_\tau$  where:

$${}^0 \left[ \begin{array}{c} \uparrow \\ \downarrow \end{array} \otimes \begin{array}{c} \uparrow \\ \downarrow \end{array} \right]_{10} \leftrightarrow {}^0 \left[ \begin{array}{c} \uparrow \\ \downarrow \end{array} \otimes \begin{array}{c} \uparrow \\ \downarrow \end{array} \right]_{10} \leftrightarrow {}^0 [\lambda \otimes -\lambda]_{10} \leftrightarrow {}^{10}\lambda_0 \leftrightarrow \begin{array}{c} \uparrow \\ \downarrow \end{array}_0 \leftrightarrow \begin{array}{c} \uparrow \\ \downarrow \end{array}_0$$

Arithmetical figure  $\alpha\Gamma$  of mechanical links in sway zones (zero zones) defines (among other significant facts) the ability of higher strata systems to include lower ones and to immerse into smallest systems, to change them within their contents (as insight in old authority). In scheme  $\alpha\Gamma$ :

$$\beta \{0.1 \otimes 0.1 \leftrightarrow 0.01, 10 \otimes 10 \leftrightarrow 100 \dots\}$$

It means that higher authority has stronger links with lower systems than their own links in their contents. And  ${}^\beta r_{uch_\tau}$  of higher sway forestall significantly all ruchs in earlier times fields (higher systems are symbols of their natural history).

Note of dimension  ${}^\beta \{-1,0,+1\}$  in authority symbol of  ${}^\beta \Lambda$  has mark of its own dimension  $\{{}^\beta 0\}$  and links with earlier and new times  $\{{}^\beta +1\}$  and  $\{{}^\beta 1\}$ . Note of magnitude  ${}^\beta \{0.1,1,10\}$  in authority symbol has own sign of magnitude  $\{{}^\beta 1\}$  and links with old order  $\{{}^\beta 0.1\}$  and meta  $\{{}^\beta 10\}$ .

Mathematical schemes  ${}^\times \alpha^\lambda$  and  ${}^\div \alpha^\lambda$  are symbols of mechanical thing – symbols of swaying scales.

And the main mechanical acts  ${}^\times \rho^\lambda$  and  ${}^\div \rho^{\lambda \rightarrow \beta}$  are defined even by original figures  ${}^\times \alpha^\lambda$  and of  $A^\lambda$  mathematics where  $\rho^\lambda \leftrightarrow \{{}^\times \rho^\lambda, {}^\div \rho^{\lambda \rightarrow \beta}\}$  is way of hierarchical systems with their natural cons in times  $\lambda_\tau$  to new ones in time  $\lambda$  and meta  $\beta$ .

Scheme  $\alpha^\lambda | \Lambda^\lambda$  defines  $\rho^\lambda$  as numbers:

$$\begin{aligned} \beta_\tau^\lambda &\leftrightarrow \beta \{ \oplus \leftrightarrow \otimes \leftrightarrow \oplus \} \leftrightarrow \beta \begin{array}{c} \uparrow \\ \downarrow \end{array} \leftrightarrow \beta \rho_\tau \\ \beta \begin{array}{c} \uparrow \\ \downarrow \end{array} &\leftrightarrow \beta mach_\tau \leftrightarrow \beta 1_\tau mach \leftrightarrow \beta \begin{array}{c} \uparrow \\ \downarrow \end{array}^{chem} \\ \beta \begin{array}{c} \leftarrow \\ \rightarrow \end{array} &\leftrightarrow \beta \{ {}^{+1} \oplus, {}^0 \otimes, {}^{-1} \oplus \}_\tau \end{aligned}$$

where  ${}^{\beta+1} \oplus, {}^{\beta 0} \otimes, {}^{\beta-1} \oplus$  – tasks of  ${}^\beta mach_\tau, {}^\beta mech_\tau$  – mechanical scale (lower strata with total order),  ${}^\beta chem_\tau$  – chimerical scale (higher strata, hazy zone of  $\rho^\lambda$ ).

Mechanical gist of number  ${}^\beta \lambda_\tau$  turns  $\{{}^\beta \Lambda\}$  into hierarchical field of functions worthy to cope with any mechanical (cybernetical) task by simple arithmetical means.

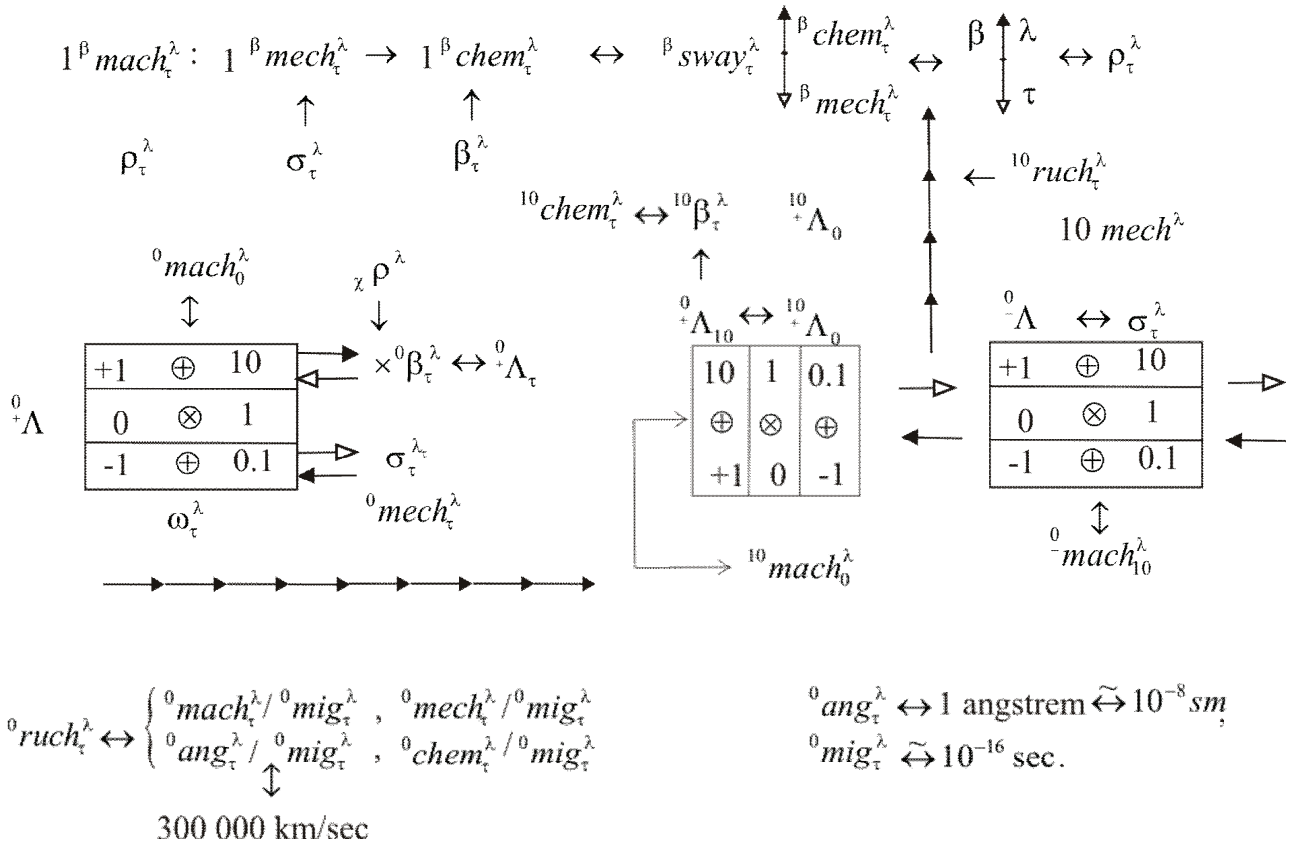
Scheme  $\alpha^\lambda | \Lambda^\lambda$ , as image of mechanical system, defines the main mechanical processes in single ether things and in the whole ether field.

In ether things it is growth of dimensions within their contents (change of their own order) and turning them into  $1000\delta\iota\mu$  systems of their metatime  $\lambda$  (hazy thing of time  $\lambda$ ).

In ether field it is organization of links of ether things – ways of ether enlighten by new order, turning old ether chaos into mechanical scales of sway ( $1000\delta\iota\mu$ ) systems, and then – into field of hierarchical haze of new time  $\lambda$ .

### 3.3 NATURAL SYSTEMS IN FIELDS OF ETHER AND HIERARCHICAL HAZE $\beta^\lambda$ (BEGINNING OWN HISTORY OF TIME $\lambda$ )

Natural history of time  $\lambda$  was process of  $1000\delta t \mu$  system  $\omega_0^\lambda$  arising in ether field  $\sigma^{\lambda_\tau}$ . Original sway  $\omega_0^\lambda$  of time  $\lambda$  defines new fields –  $\sigma^\lambda$ ,  $\beta^\lambda$  and new mechanical process. However scheme  $\alpha^\lambda | \Lambda^\lambda$  is acting (with exchange  $\tilde{\lambda}_\tau$  by  $\lambda_\tau$  and  $\lambda_\tau$  by  $\lambda$ . Now the main act  ${}^\beta mach_\tau^\lambda$  of hierarchical mechanics  $P^\lambda$  it noted:



Acting time  $\lambda$  is time of geometrical systems reasoned by dimensions of its original authority  $\omega_0^\lambda$ .

Own order of system  $\omega_0^\lambda$  is beyond of ether field measures. Moreover it remains hazy in time  $\lambda$  till  $A^\lambda$  mathematics (meta authority of time  $\lambda$ ) proves to be able to immerse into this order – by means of hierarchical arithmetic  $\Lambda^\lambda$  and mechanics  $P^\lambda$  (scheme  $\alpha^\lambda | \Lambda^\lambda$ ).

Meta authority  $A^\lambda$  of time  $\lambda$  mark new order of hierarchical systems (imaged by scheme  $\times \alpha^\lambda$ ,  $\div \alpha^\lambda$ ) where geometrical measures (geometrical dimensions, geometrical nearness in links and other) are exchanged by new dimensions (they are  $A^\lambda$  strata) and by new nearness ( $A^\lambda$  strata links, scheme in fig.2).

Since that the chimerical scales  $\beta_\tau^\lambda \leftrightarrow {}^\beta chem_\tau^\lambda$  of systems  $\omega_\tau^\lambda$  in time  $\lambda$  (hazy zones) may be in any place of ether field  $\sigma^{\lambda_\tau}$  (or new field  $\sigma^\lambda$ ) – unlike time  $\lambda_\tau$  when chimerical scales  ${}^\beta chem_\tau^{\lambda_\tau}$  of

systems  $\omega_{\tau}^{\lambda_{\tau}}$  must be geometrically near by sway strata  $\omega_{0\tau}^{\lambda_{\tau}} \leftrightarrow \beta_{0\tau}^{\lambda_{\tau}}$ . (Links in  $A^{\lambda}$  are much more strong than geometrical ones).

Directly after act:

$$\times \rho^{\lambda} : \omega_0^{\lambda} \rightarrow \sigma^{\lambda} \leftrightarrow \{ \{ \omega_{0\tau}^{\lambda} \}, \sigma_{\tau}^{\lambda_{\tau}} \}$$

new field  $\sigma^{\lambda}$  is initial chaos of time  $\lambda$ , chaos of new systems:

$$\omega_{\tau}^{\lambda} \leftrightarrow \{ \{ \omega_{0\tau}^{\lambda} \}, \sigma_{\tau}^{\lambda_{\tau}} \}$$

whose sway systems  $\omega_{0\tau}^{\lambda}$  are similar to original sway  $\omega_0^{\lambda}$  and are hazy in measures of  $\sigma^{\lambda_{\tau}}$ .

The main mechanical tasks (tasks of processor  ${}^{\beta} mach_{\tau}^{\lambda}$ ) of new systems  $\{ \omega_{\tau}^{\lambda} \}$  (protons) are:

- to organize their mechanical scale (total ordered ether zones):

$$\{ \omega_{i\tau}^{\lambda_{\tau}} \} \leftrightarrow \sigma_{\tau}^{\lambda_{\tau}} \leftrightarrow {}^{\beta} mech_{\tau}^{\lambda}$$

by tact  ${}^{\beta-1} \oplus_{\tau}^{\lambda}$ : it is tact of charge;

- to turn ether thinks  $\omega_{i\tau}^{\lambda_{\tau}}$  of mechanical scales into hazy systems  $\beta_{i\tau}^{\lambda}$  similar to original authority  $\omega_0^{\lambda}$  and to their own sway systems  $\omega_{0\tau}^{\lambda}$  ( $\omega_{0\tau}^{\lambda} \leftrightarrow \beta_{0\tau}^{\lambda}$ ) by tact  ${}^{\beta 0} \oplus_{\tau}^{\lambda}$ ;
- to organize hazy zones  $\{ \beta_{i\tau}^{\lambda} \} \leftrightarrow {}^{\beta} chem_{\tau}^{\lambda_{\tau}}$  (chemical scales) by tact  ${}^{\beta+1} \oplus_{\tau}^{\lambda}$  of  ${}^{\beta} mach_{\tau}^{\lambda}$ :

$${}^{\beta} mach_{\tau}^{\lambda} \leftrightarrow {}^{\beta} \left\{ -1 \oplus, {}^0 \otimes, {}^{+1} \oplus \right\}_{\tau}^{\lambda}$$

In this process the new  $1000\delta t \mu$  (3 dim) systems  $\beta_{i\tau}^{\lambda}$  arise in mechanical scales  ${}^{\beta} mech_{\tau}^{\lambda}$ , near by sway zone  $\omega_{0\tau}^{\lambda}$  of  $\omega_{\tau}^{\lambda}$ . Sway systems  $\omega_{0\tau}^{\lambda}$  are less than  $\beta_{i\tau}^{\lambda}$ :  $\text{mag}(\beta_{i\tau}^{\lambda}) \leftrightarrow \text{mag}(\omega_0^{\lambda})$  while  $\text{mag}(\omega_{0\tau}^{\lambda}) \leftrightarrow {}^{\beta} 0.001 \text{mag}(\omega_0^{\lambda})$ .

Hence, systems  $\omega_{\tau}^{\lambda}$  must change their place. It is new  ${}^{\beta} ruch_{\tau}^{\lambda}$  of time  $\lambda$ . Unlike  ${}^{\beta} ruch_{\tau}^{\lambda}$  of time  $\lambda_{\tau}$  which changes only order of contents of systems  $\omega_{\tau}^{\lambda_{\tau}}$ , the new one changes the places of  $\omega_{\tau}^{\lambda}$  on  ${}^0 ang^{\lambda}$ . And these changes lead to changes in ether field  $\sigma^{\lambda_{\tau}}$  - in field of change, where magnetic field arises (Fig. 3).

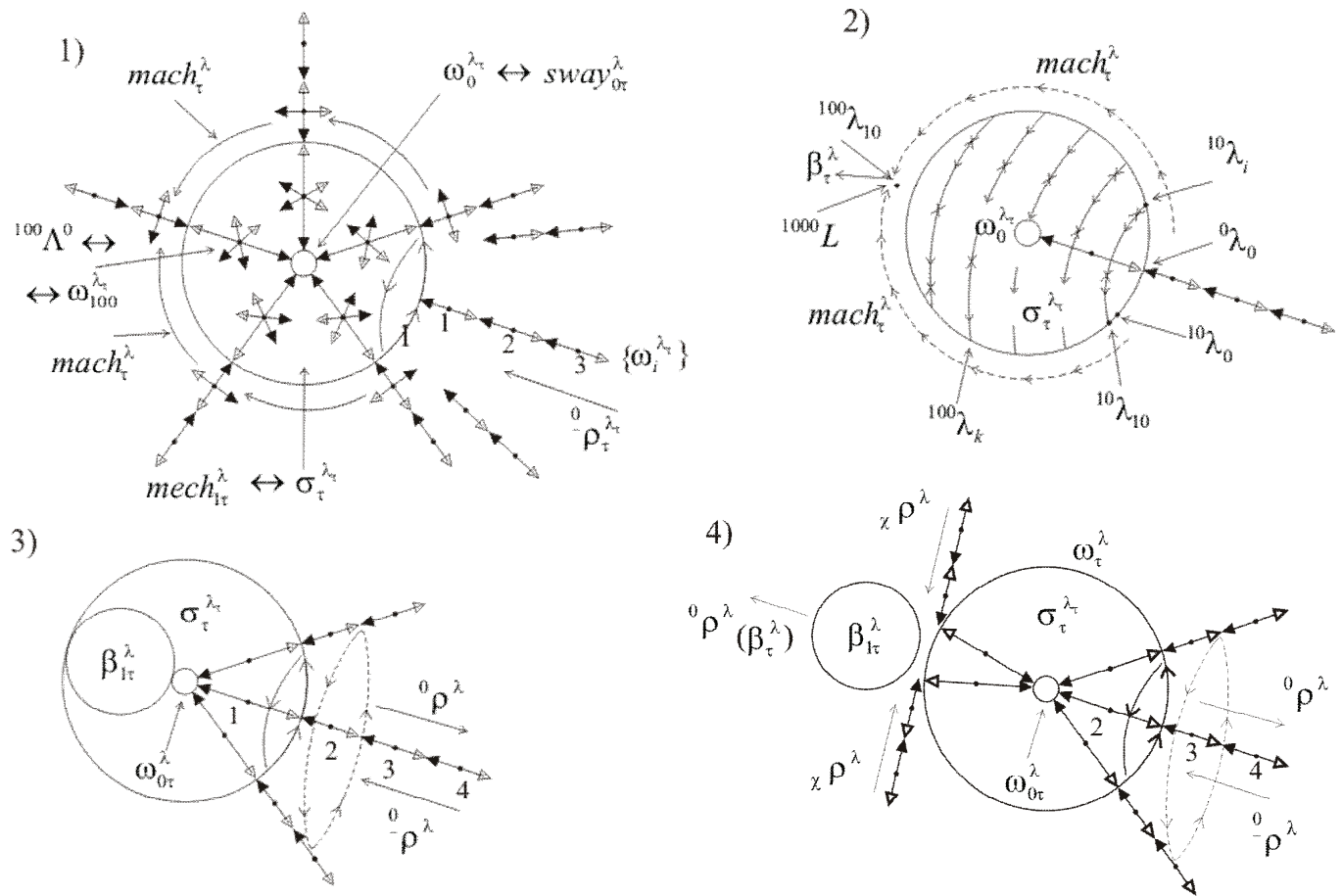
Mechanical scale  ${}^{\beta} mech_{\tau}^{\lambda}$  of sway zone  $\omega_{0\tau}^{\lambda}$  brings its whole charge whose measure of time  $\lambda$  is  $1^{-1} mach_{\tau}^{\lambda}$ . But its ether measure is  ${}^{100} mach^{\lambda_{\tau}}$ . In fact, an  $\omega_{\tau}^{\lambda_{\tau}}$ , ordered by sway signal  ${}^0 \gamma_{10}^{\lambda_{\tau}}$ , is changed system. It has direction  ${}^{\beta \uparrow \lambda_{\tau}} \nabla_{\tau}$  and ability to order other ether things linked with it. It means that  $P^{\lambda}$  mechanics owns fraction of charge.

Initial protons  $\omega_{\tau}^{\lambda}$  have  $\nu \leftrightarrow 1$  ether layer in their mech zone. In the run of events  $\nu$  increases, now  $\nu \leftrightarrow 2000$  (Fig. 4, scheme 1)). Number  $\nu$  of layers in mech scale is measure of weight - 1 layer can in 1 mig turn only 1 ether thing  $\omega_{i\tau}^{\lambda_{\tau}}$  into  $\beta_{i\tau}^{\lambda}$ , while  $\nu$  layers can turn  $\nu$  ether things into  $\beta$  - systems at once. But this process requires to include into mech scale  $\nu$  ordered ether things together, it can not begin when their number less than  $\nu$  (since that the amount  $\nu$  is measure of inertia). Unlike charge,  $\nu$  may be only integer number and only of time  $\lambda$ .

New ether thing is included into mech scale in place where density of ether field is highest. It will be place ahead  $\omega_\tau^\lambda$  ( ${}^0\text{orts}_0^\lambda$  of its rush). After that the scale magnitude outnumbers its con; its dimensions grow in all its members (all ether things) and collect (by act  $-1 \oplus_\tau^\lambda$  of uniting) in ether thing  $\omega_{100}^{\lambda_\tau}$  (behind  $\omega_\tau^\lambda$ ). Dimensions of  $\omega_{100}^{\lambda_\tau}$  grow too, and achieve ones of sway system  $\omega_{0\tau}^\lambda$  ( $1000\delta i\mu$ ). Then  $\omega_{0\tau}^\lambda$  is multiplied in  $\omega_{100}^{\lambda_\tau}$  – turn  $\omega_{100}^{\lambda_\tau}$  into new  $\beta^\lambda$  system (by act  ${}^0 \oplus_\tau^\lambda$ ) and sends new  $\beta^\lambda$  things of its chimerical scale to other ones (by act  $+1 \oplus_\tau^\lambda$ ) (Fig. 4, scheme 1).

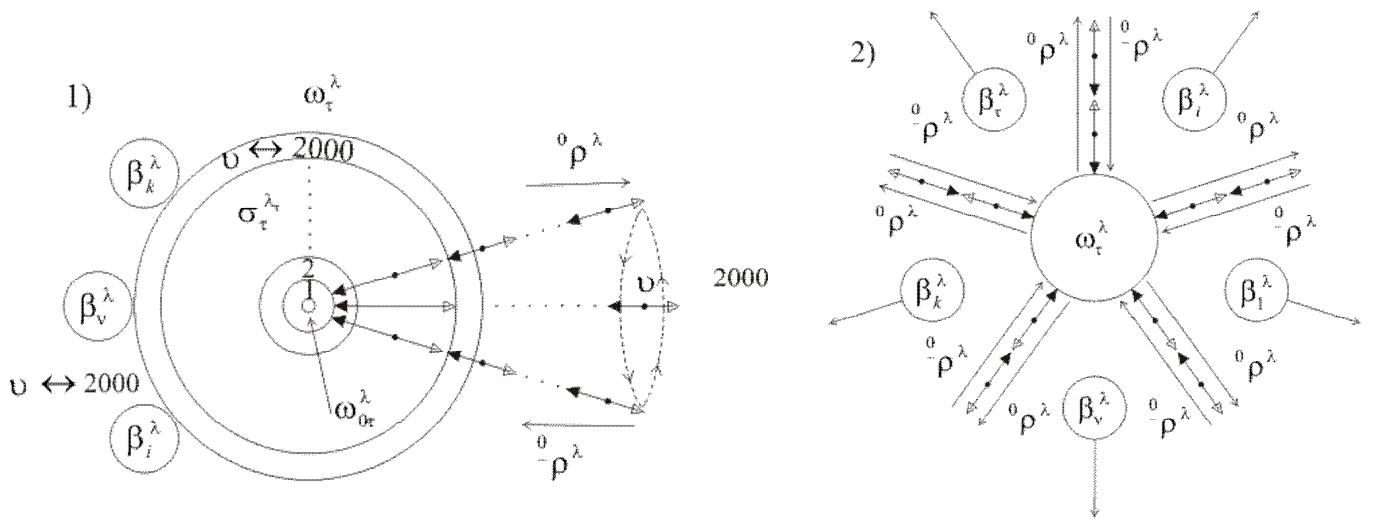
It means that  ${}^\beta\text{ruch}_\tau$  must organize ether stream ahead  $\omega_\tau^\lambda$ . This stream (or wave if ruch is not long) is directed to  $\omega_\tau^\lambda$ . But it looks as stream (or wave) of ether which runs away (this wave rear-ranges more and more far ether things near to  $\omega_\tau^\lambda$ ). It is known as braking radiation or magnetic bremsstrahlung in synchrotrons. But really it is ether delivery to  $\omega_\tau^\lambda$  in any its ruch (radio waves belong to described ones).

Far layers of mech scale can fly away as new systems – photons (they are considered in their graphical images in Fig 5.3), electrons (Fig 5.1), positrons (Fig 5.2), neutrino (Fig 7.1, scheme 2.2)



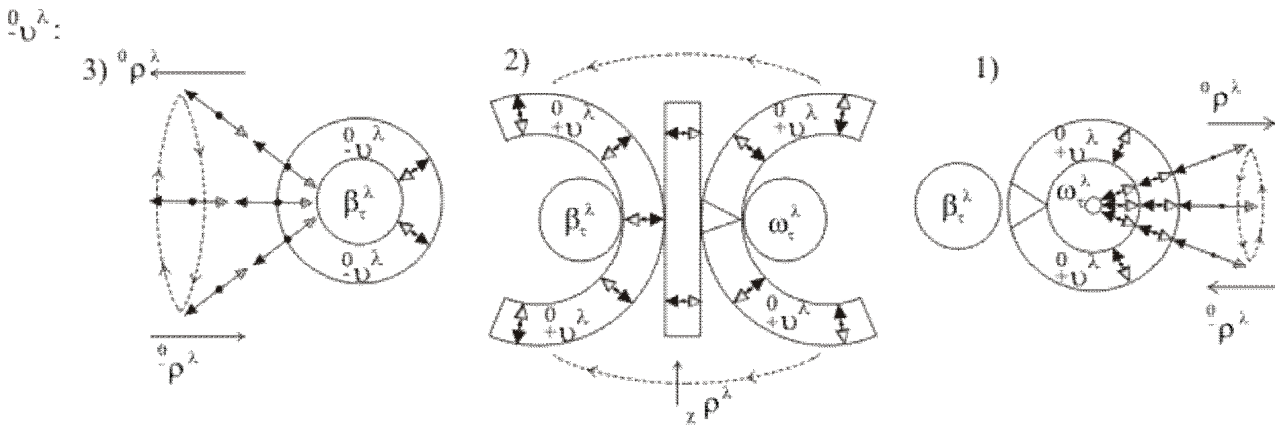
Maxwell laws in hierarchical mechanics. 1) charged system  $\omega_\tau^\lambda$  includes new ether things  $\{\omega_i^{\lambda_\tau}\}$ ,  $i \leftrightarrow 1, 2, 3, \dots$  of stream  ${}^0\rho_\tau^\lambda$  into its mech  $\sigma_\tau^{\lambda_\tau}$  scale; 2) process  $\rho^\lambda$  ( $mach^\lambda$ ) begins in  ${}^0\lambda_0$  (place of including); products  $[\beta^\lambda \lambda_\tau \times \beta^\lambda \lambda_k]$  lead to spin of  $\omega_\tau^\lambda$  and dimensions growth in  ${}^0mech_\tau^\lambda$  scale which ends in place  ${}^{1000}L$  of thing  $\omega_{100}^{\lambda_\tau}$ ; 3)  $\omega_{100}^{\lambda_\tau}$  turn into  $\beta_{1\tau}^\lambda$  – thing of chimerical scale  $\beta_\tau^\lambda$  of  $\omega_\tau^\lambda$ ;  $\beta_{1\tau}^\lambda$  arising changes the place of whole  $\omega_\tau^\lambda$  (ruch  ${}^0\rho_\tau^\lambda$ ); 4)  $\beta_{1\tau}^\lambda$  goes away and magnetic stream  ${}^\chi\rho_\tau^\lambda$  renovates field of charge of  $\omega_\tau^\lambda$ ;  $\omega_\tau^\lambda$  includes new ether thing delivered by counter ruch  ${}^0\rho_\tau^\lambda$  (ether stream, ether wave).

Fig.3. Maxwell laws in hierarchical mechanics.



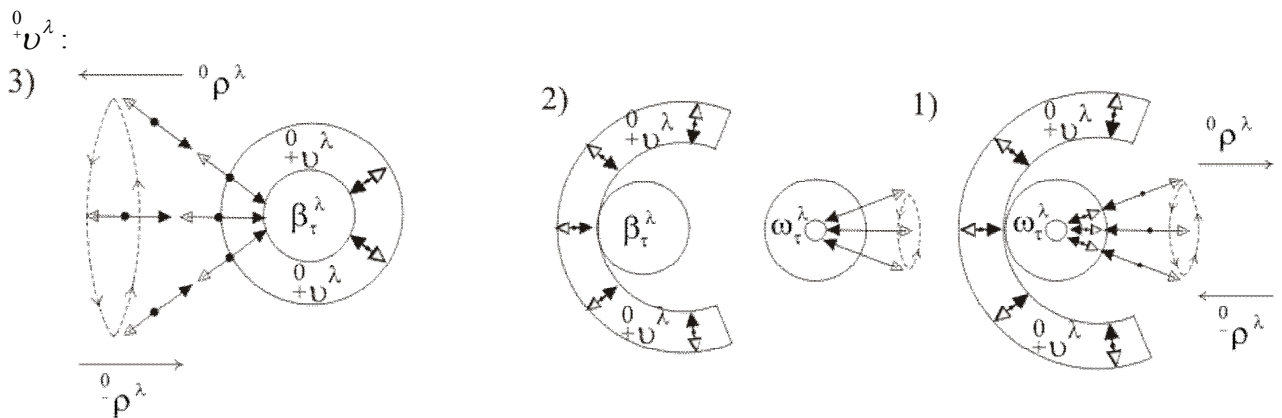
1) Proton with  $v$  mech scale ( $v \leftrightarrow 2000$ ) includes  $v$  other things into  $\sigma_{\tau}^{\lambda}$  and turns them into  $v$   $\beta$ -systems by one  $mach_{v_{\tau}^{\lambda}}$ ; 2) Rest of charge is its balanced ruch in all sides.

Fig.4. Proton  $\omega_{\tau}^{\lambda}$ .



${}^0_{-}v^{\lambda}$  1)  $v$ -the mechanical scale of proton  $\omega_{\tau}^{\lambda}$  turns inside and 2) winds around  $\beta$ -thing by ruch  ${}_x\rho^{\lambda}$ ; 3) electron has its own spin and change field orientation.

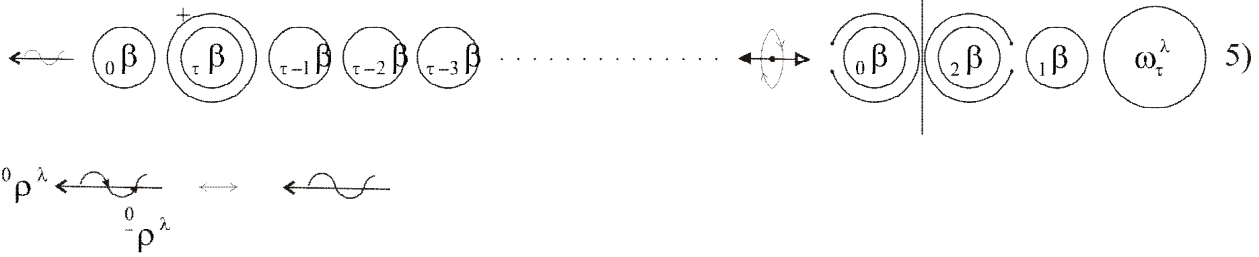
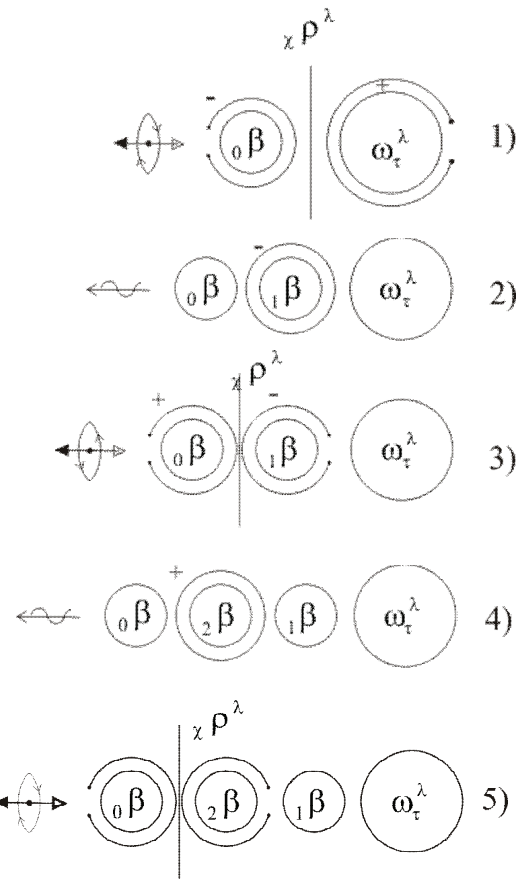
Fig.5.1. Electron  ${}^0_{-}v^{\lambda}$ .



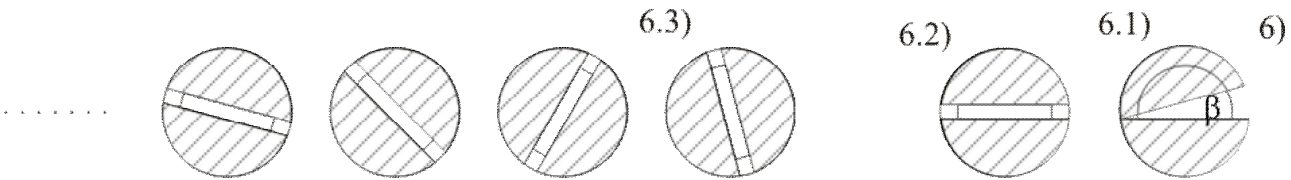
${}^0_{+}v^{\lambda}$ : 1)  $v$ -the mech scale of proton  $\omega_{\tau}^{\lambda}$  cracks; 2) it is renovated round  $\beta$ -thing leaved by proton; 3) positron keeps proton field.

Fig.5.2. Positron  ${}^0_{+}v^{\lambda}$ .

- 1) electron arises round  ${}_0\beta$  system and  ${}_0\beta$  is its new sway;
- 2) when electron includes ether thing ahead it, new  $\beta$  - system  ${}_1\beta$  arises within it, and  ${}_0\beta$  is rearranged in place ahead electron.
- 3) Since  ${}_0\beta$  is sway of electron, it winds round  ${}_0\beta$  by ruch  ${}_x\rho^\lambda$ , and it is turned into positron.
- 4,5) positron includes ether thing, turns it into  ${}_2\beta$  and winds round its sway  ${}_0\beta$  which is ahead it; new electron begin new tact of this process, where electron and positron change one another and bring theirs sway ahead them;  ${}_0\beta$  is strongly linked with  $\omega_\tau^\lambda$  as thing of its chimerical scale.



(suggested image of photon  ${}^0_\pm\nu^\lambda$  is convenient in definition of mechanical processes in optics (including lasers), in annihilation, in temperature changing and other).



6) polarization; 6.1) 3- dim image of mech scale cracking; 6.2) its look behind in beginning crack; 6.3) other case of polarization (ether waves  $\{\nu_\tau^\lambda\}$  ahead photon are polarized in agreement with its mech scale).

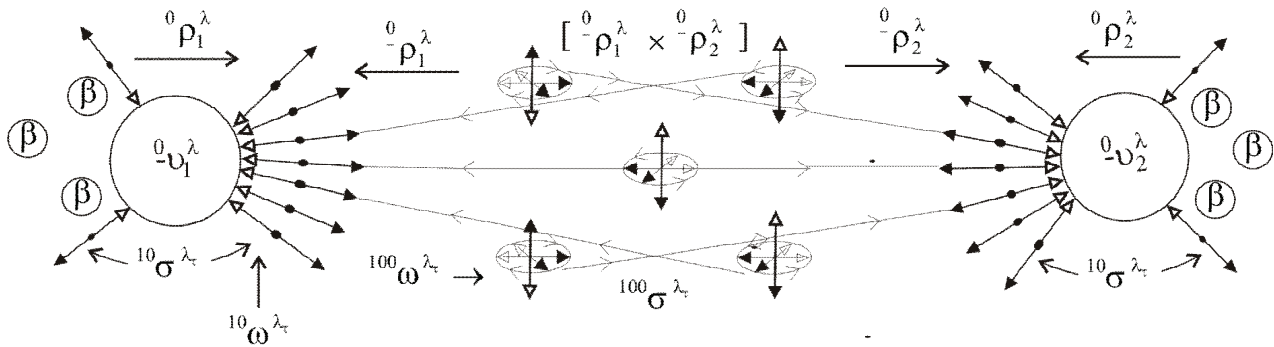
Fig.5.3.  ${}^0_\pm\nu^\lambda$  : photon.



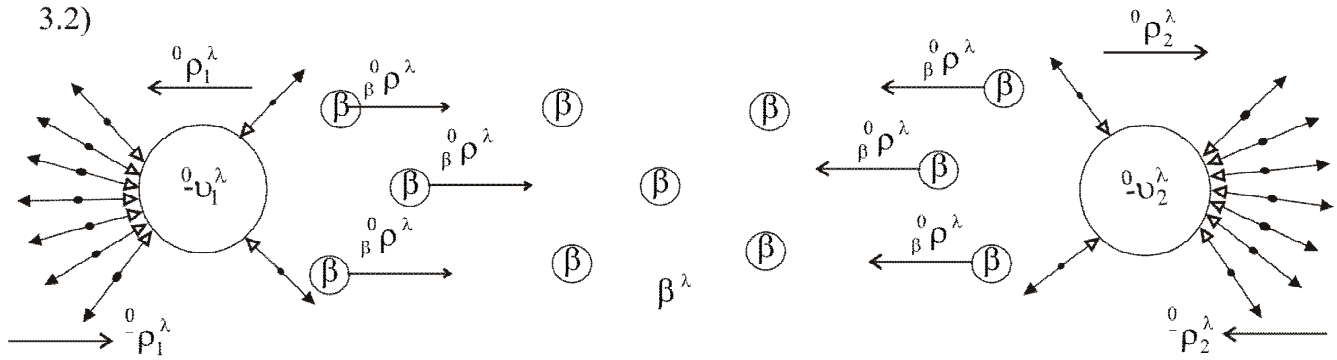


3)

3.1)



3.2)

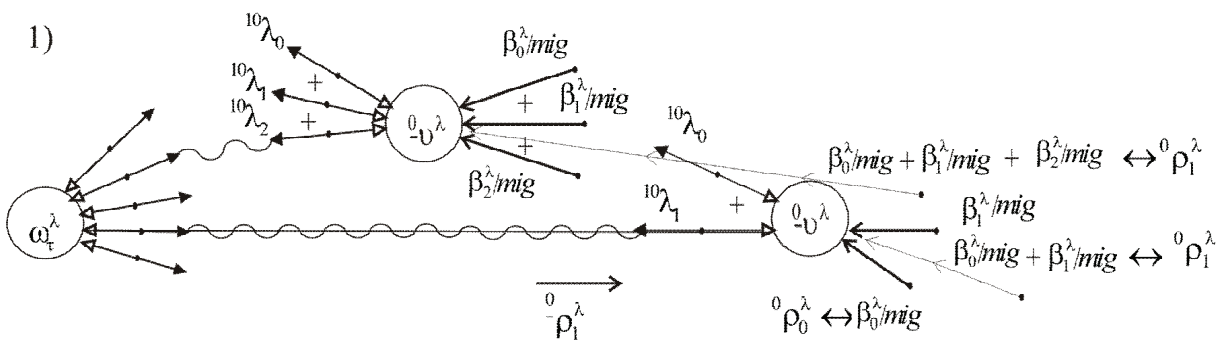


Scattering: 3.1) charges  ${}^0\text{-}v_1^\lambda$  and  ${}^0\text{-}v_2^\lambda$  with ether fields  ${}^{10}\sigma_1^{\lambda\tau}$ ,  ${}^{10}\sigma_2^{\lambda\tau}$ , such  ${}^0\rho_1^\lambda$ ,  ${}^0\rho_2^\lambda$  and counterch  ${}^0\rho_1^\lambda$ ,  ${}^0\rho_2^\lambda$  at first draw together since ether density between them is higher than in other places; product  $[{}^0\rho_1^\lambda \times {}^0\rho_2^\lambda]$  of counterch grows dimensions of  $\sigma^{\lambda\tau}$  with  ${}^{10}\sigma^{\lambda\tau}$  to  ${}^{100}\sigma^{\lambda\tau}$ ; ether area  ${}^{100}\sigma^{\lambda\tau}$  is gravitational zone.

3.2) field  ${}^{100}\sigma^{\lambda\tau}$  has new direction, and it leads to delay of  ${}^0\rho_1^\lambda$  and  ${}^0\rho_2^\lambda$ ; since that  ${}^0\text{-}v_1^\lambda$  and  ${}^0\text{-}v_2^\lambda$  change signs of orders  ${}^\beta\gamma_1$  and  ${}^\beta\gamma_2$  within them and begin scattering; chimerical zone grows.

Fig.6.2. Changes of ether  $\sigma^{\lambda\tau}$  and field of haze  $\beta^\lambda$  in ruchs of charges. (ending)

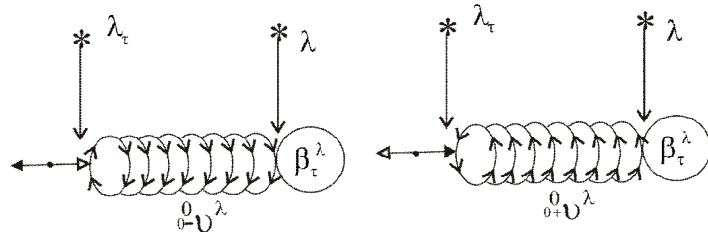
1)



Magnitude and direction of  ${}^0\rho^\lambda$  (ruch of electron  ${}^0\text{-}v^\lambda$ ) at first are measured by  ${}^{10}\lambda_0$  and  $\beta_1^\lambda/mig$ . Owing to coherence of its counterch  ${}^0\rho^\lambda$  with field of proton  $\omega_\tau^\lambda$ ,  ${}^0\text{-}v^\lambda$  includes ether things  ${}^{10}\lambda_1$  and  ${}^{10}\lambda_2$  and directs its ruch  ${}^0\rho^\lambda$  to  $\omega_\tau^\lambda$ ; magnitude of  ${}^0\rho^\lambda$  grows (widens ahead to  $({}^{10}\lambda_0 + {}^{10}\lambda_1 + {}^{10}\lambda_2)$  and lengthens behind to  $(\beta_0^\lambda/mig + \beta_1^\lambda/mig + \beta_2^\lambda/mig)$ );  $\omega_\tau^\lambda$  and  ${}^0\text{-}v^\lambda$  in the end are united.

Fig.7.1 Binding simplest systems of chemical dimension of time  $\lambda$ . (beginning)

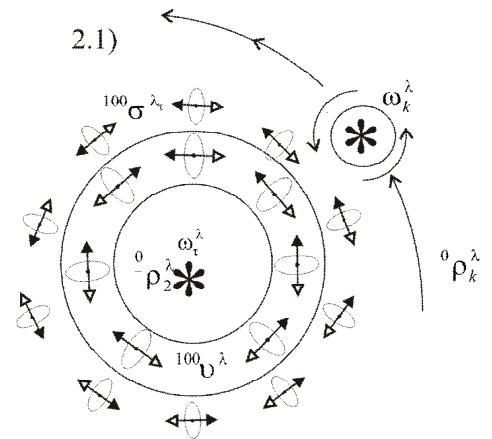
2) 2.2)



2.1)

$${}^0 \rho_\pi^\lambda$$

$${}^{10} \nu^{\lambda\tau} \oplus \omega_\tau^\lambda \leftrightarrow \{ {}^{100} \nu^{\lambda\tau} + \omega_\tau^\lambda \} \leftrightarrow {}_0 \omega_{\tau \rightarrow 1}^\lambda \leftrightarrow \text{neutron}$$



charge of gravitational field  ${}^{100} \sigma^{\lambda\tau}$  of neutron  ${}_0 \omega_1^\lambda$  is turned & locked in  ${}^{100} mech^{\lambda\tau}$  scale  ${}^{100} \nu^{\lambda\tau}$ ; gravitation waves  $\{ {}^{100} \lambda_\tau^{\lambda\tau} \}$  do not rearrange other things  $\{ \omega_\tau^{\lambda\tau} \}$ , they change orders with  ${}^{10} \gamma^{\lambda\tau}$  to  ${}^{100} \gamma^{\lambda\tau}$  within any  $\omega_\tau^{\lambda\tau}$  in its way, these waves may be measured owing to waning charge activity in ether field;

(\*) is mark of pole of neutron, where its charge is acting;

convenient ruch  ${}^0 \rho_k^\lambda$  of other system  $\omega_k^\lambda$  in gravitational field is orbital one;

2.2) neutrino  ${}^0 \nu^{\lambda\tau}$  and  ${}^0 \nu^{\lambda\tau}$  have not  $\beta$ -things within and their ruchs are similar to ones of photons (one ether thing ahead and one  $\beta$ -thing behind in their polar zones); unlike photon, neutrino keeps its initial construction; neutrino can arise when neutron wanes (and in other process);

3)  ${}^0 \rho_\pi^\lambda$

$${}^{10} \nu^{\lambda\tau} \oplus \beta_\tau^\lambda \otimes \omega_\tau^\lambda \leftrightarrow {}_\beta \omega_1^\lambda \leftrightarrow {}_0 \sigma_1^\lambda \leftrightarrow \text{hydrogen atom};$$

atom  ${}_\beta \omega_1^\lambda$  includes  $\beta^\lambda$  system and owing to that its geometrical magnitude is

$$\sim 1 \text{ angstrom}$$

(magnitude of  $\beta^\lambda$ ); places of its  ${}^{100} mech^{\lambda\tau}$  scale, hidden for proton, are acting as electron poles; in its turn, proton can have its own poles (holes in  ${}^{100} mech^{\lambda\tau}$  scale); thanks to that, the gravitational field of atom may be turned into field of magnet, where proton pole is North and electron one is South;

hydrogen atom can include many electron (or positron) scales in its alone mech scale; in that case the number of  $\beta$ -things within this scale increases;

proton as hydrogen nucleus is noted as

$$\delta \mu \leftrightarrow {}_0 \omega^\lambda \leftrightarrow \text{level}$$

$$\text{charge} \leftrightarrow 1^{-1} \leftrightarrow \text{one sway system } {}^0 \omega_0^\lambda \text{ with one its}$$

$$\leftrightarrow +1 \quad \text{mechanical scale whose weight is } \sim 2000 \text{ layers}$$

gravitation field of atoms bring down their mechanical activity, but they allow to collect atoms (together with their ether fields) in stars – zones with high ether density, where this activity grows again.

3)

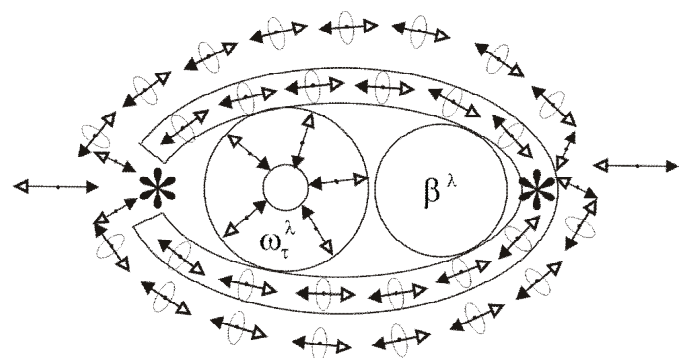
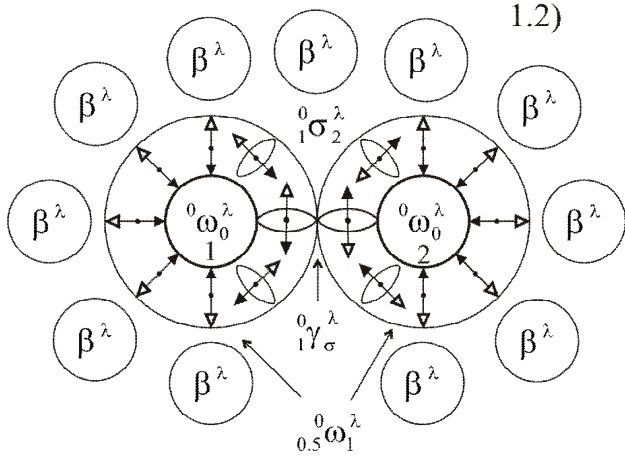
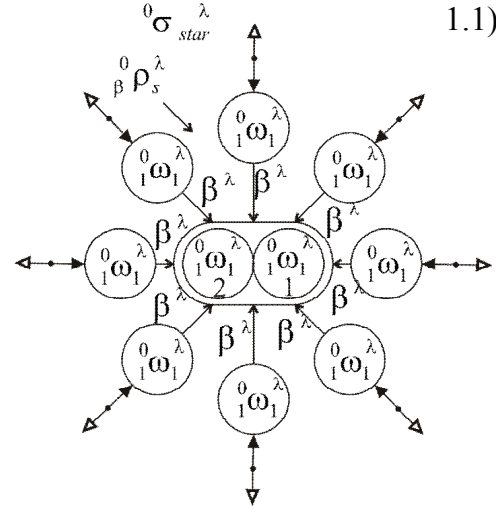


Fig.7.2 Binding simplest systems of chemical dimension of time  $\lambda$ . (ending)

1)



1.1)

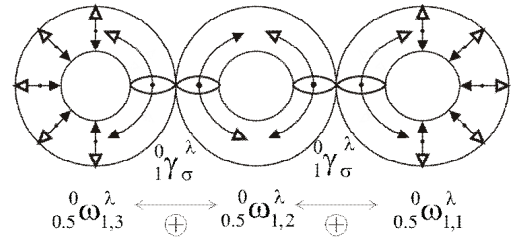


$$0_{\beta}\rho_s^{\lambda} \oplus 0.5\omega_{1,1}^{\lambda} \oplus 0.5\omega_{1,2}^{\lambda} \rightarrow 0_1\sigma_2^{\lambda} \leftrightarrow \{0.5\omega_{1,1}^{\lambda}, 0_1\gamma_{\sigma}^{\lambda}, 0.5\omega_{1,2}^{\lambda}\}$$

$$0_1\gamma_{\sigma}^{\lambda} \leftrightarrow \{100\omega_{\tau}^{\lambda}\}, \delta i\mu(0_1\gamma_{\sigma}^{\lambda})|_{\lambda_{\tau}} \leftrightarrow 100^{\lambda} < \delta i\mu(0_1\gamma_{\sigma}^{\lambda})|_{\lambda_{\tau}} \leftrightarrow 1000^{\lambda_{\tau}}$$

$$0_1\sigma_2^{\lambda} \oplus 0_1\omega_1^{\lambda} \rightarrow 0_1\sigma_3^{\lambda} \leftrightarrow \{0.5\omega_{1,1}^{\lambda}, 0_1\gamma_{\sigma,1,2}^{\lambda}, 0.5\omega_{1,2}^{\lambda}, 0_1\gamma_{\sigma,2,3}^{\lambda}, 0.5\omega_{1,3}^{\lambda}\}$$

1.3)



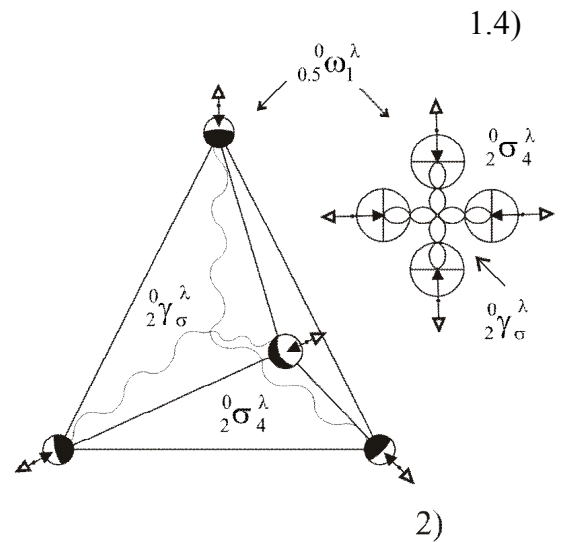
1) 1.1) Star  $0\sigma_{star}^{\lambda}$  with process  $0_{\beta}\rho_s^{\lambda}$  (chemical technology,  $\beta$ -star technology) allows to mech protons  $0_1\omega_{1,1}^{\lambda}$  and  $0_1\omega_{1,2}^{\lambda}$  by  $\beta$ -tails of systems  $\{0_1\omega_{1,i}^{\lambda}\}$ ;

1.2) being charged systems,  $0_1\omega_{1,1}^{\lambda}$  and  $0_1\omega_{1,2}^{\lambda}$  begin to seek ether; merely mech scale of neighbour can maintain their mechanical activity; they try to change order  $\gamma^{\lambda\tau}$  of alien mech scale by own one; this process seizes all  $\nu$  layers of their mech scale: many layers are turned into their own  $\beta$ -tails (rests of these layers are flying as photons); this bang grows 3-dim space ( $\beta$ -zone) near protons; when merging process is balanced, protons loss 0.5 charge (it is exchanged by gravitational scale between them) and are linked as constructions  $0_1\sigma_2^{\lambda}$  - nucleus of heavy hydrogen (deuterium);  $0_1\sigma_2^{\lambda}$  has two sway systems;  $0\omega_{0,1}^{\lambda}$  and  $0\omega_{0,2}^{\lambda}$  linked by gravitational bridge  $0_1\gamma_{\sigma}^{\lambda}$ ; since  $\delta i\mu(0_1\gamma_{\sigma}^{\lambda})$  less than one of sway, the construction  $0_1\sigma_2^{\lambda}$  can not be regarded as new  $\omega^{\lambda}$ ; but bridge  $0_1\gamma_{\sigma}^{\lambda}$  allows to cohere mechanical processes in  $0_1\sigma_2^{\lambda}$  and it acts similar to thing;  $\beta$ -things leave their star though its crown; when  $\beta$ -zone within star is too big, the star bursts;

1.3)  $0_1\sigma_3^{\lambda}$  - tritium (super heavy hydrogen) includes 3 protons where  $0_1\omega_{1,2}^{\lambda}$  has not charge,  $0.5\omega_{1,1}^{\lambda}$  and  $0.5\omega_{1,3}^{\lambda}$  keep 0.5 charge;

Fig.8.1 Key chemical systems (beginning): 8.1.1-3) star (chemical) technology (beginning).

1.4)  ${}^0_2\sigma_4^\lambda$  helium consists of 2 deuterium  ${}^0_1\sigma_{2,1}^\lambda, {}^0_1\sigma_{2,2}^\lambda$  with linked  $\gamma$ -bridges  $({}^0_1\gamma_\sigma^\lambda)_2$ ; it allows to keep charges; geometrical organization of single helium nucleus is tetrahedron (3-dim simplex); gravi-zone is within it;



2) hydrogen and helium are key chemical systems – the main units of chemical nuclei  ${}^0_k\sigma_v^\lambda$ ; helium in  ${}^0_k\sigma_v^\lambda$  looks as pyramid where 4 tops are protons, and 1 top is hinge of  $\gamma$ -bridges; these hinges are coupled in  ${}^0_k\sigma_v^\lambda$ ; oxygen  ${}^0_4\sigma_8^\lambda$  is tetrahedron whose tops are bases of pyramids; till  ${}^0_{20}\sigma_{40}^\lambda$  chemical nuclei are note as  ${}^0_k\sigma_{2k}^\lambda$  since their  $\gamma$ -bridges are coupled in one place, then number of hinges increases; lithe  $\gamma$ -bridges allow to change nuclear geometry which defines one of crystals and other chemical systems organized by named simplex areas (lines triangles and pyramids) in  $\beta$ -zone of stars.

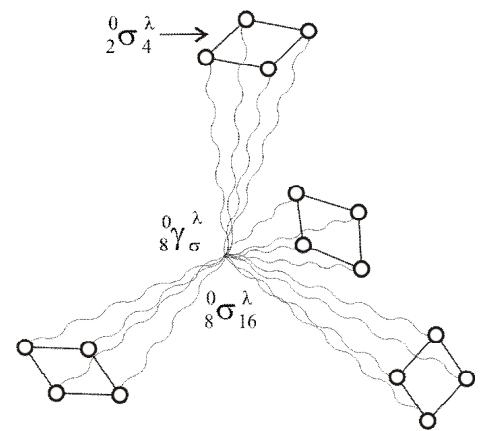


Fig.8.2 Key chemical systems (ending):

1.4) star (chemical) technology (ending). 2) nuclear geometry.

and other. Electrons fields in cohered with ones of protons, and it leads to their uniting (as neutrons (Fig 7.1, scheme 2.2) or as hydrogen atoms ((Fig 7.1, scheme 3))) when protons prove to be within electrons again (as in layers of their scales). In this process their fields are changed and turned into gravitational ones whose dimensions are higher, but it can not work as charged scale.

Like process allows to unite protons (Fig. 8), when certain areas of their mech scales are turned into connected neutral zones (nucleus links) and charge is decreased (Fig. 8.1, schemes 1.3-1.4, Fig. 8.2).

All considered fields are states of ether field  $\sigma^{\lambda\tau}$ . They are defined in scheme  $\alpha^\lambda | \Lambda^\lambda$  together with arithmetical acts with them. They are known, and scheme  $\alpha^\lambda | \Lambda^\lambda$  is simple improvement of their images.

Field of hierarchical haze  $\beta^\lambda$  of time  $\lambda$  is new in science. However its practical significance is very high. All mechanical processes of acting time  $\lambda$  (see for example Fig. 6) increase haze  $\beta^\lambda$  and are authorized by it.

### 3.4 MECHANICS OF EARLIER STRATA IN HIGHER DIMENSIONS OF TIME $\lambda$

Hierarchical mechanics of natural systems in arithmetical symbols is noted as  $^{-1}P^\lambda \leftrightarrow P^{\lambda\tau}$  (mechanics of ether) and  $^0P^\lambda$  – mechanics of chemical dimension. Higher dimensions of time  $\lambda$  have own mechanics:  $^{10}P^\lambda$  – biological,  $^{100}P^\lambda$  – demographical, and  $^{1000}P^\lambda$  – mechanics of knowledge systems – hierarchical cybernetics.  $^{-1}P^\lambda$  and  $^0P^\lambda$  considered above are strata of  $^{1000}P^\lambda$ , its practical directions.

Simple&cohered mathematical figures of natural systems in  $P^\lambda$  contain symbols of things ( $\omega$ ), fields ( $\sigma$ ), process ( $P, \leftrightarrow$ ), and other  $A^\lambda$  strata. Their arrangement in pyramid or circle is way of mathematical counting organization in practical tasks where geometry is one of the main measures.

This organization is convenient in higher strata process – design&learning where  $P^\lambda$  allows to carry out heavy known tasks as arithmetical ones, and marks new horizons of science and practice. Among them is studying of haze  $\beta^\lambda$ .

Hierarchical haze  $\beta^\lambda$  is active member of all mechanical processes. Moreover,  $\beta^\lambda$  allows to organize them. There are two main ways of systems places changing: to strengthen ether field ahead them or to hide ether behind them by  $\beta$ -areas. All internal – combustion engines deal with  $\beta$ -zone which are growing (in chemical reactions) and then are directed in desired side.

Owing to chemical links in systems contents,  $\beta$ -tails of systems always arise behind the whole system. (If it has breaks in its chemical organization,  $\beta$ -zones arise in the breaks too and widen them).

$\beta$ -tails of heavy swift systems are good discerned in sky – as ones of air-lines and comets.

Liners tracks (when  $\beta$ -tails check speed of atoms and allow them to collect in steam) are reason of disasters. When other aircraft contacts with  $\beta$ -zone which hides ether stream to it, this zone proves to be “behind” aircraft. It can not fly in old direction and falls to pieces. (These events are regarded as caused by turbulence which remains unaccountable). At the same time the right applying of  $\beta$ -zone helps to save gasoline, when aircrafts fly by crane wedge. (First crane in wedge makes  $\beta$ -tails on the ends of his wings, and following ones can lean on these tails).

Comets tails are great mirrors of Sun rays. Average diameter of comet is  $\sim 5$  km., its tail achieves  $\sim 10^6$  km. It means that comet tails can not consist of its chemical materials – in that case the comet must loss almost all materials after first flying round Sun, while it keeps its orbit many times. When its tail is  $\beta$ -zone (reasoned by huge speed near Sun) comet materials remain in its contents.

Dark matter which leads to scattering astronomic systems is growing  $\beta$ -zone between them with rare ether, where  $\beta$ -things can gather and link. Astronomic systems draw the rest of ether of these zones and make them more attractive for  $\beta$ -things. The more  $\beta$ -things in this zone the higher astronomic scattering.

Earth, as chemical system, makes  $\beta$ -things all time. Hierarchical haze of time  $\lambda$  is habitual haze in evening and morning dawn or in rainy weather. (It is similar to air-liners  $\beta$ -tails.) Warm atoms have more big mechanical scales than cold ones, and include more  $\beta$ -things, hence they fly away Earth. Day streams of warm air allow heavy eagles to soar in sky.

$\beta$ -things in day streams are mainly in atoms. But Earth can make the streams of single  $\beta$ -things. They are reason of helicopters flying. Helicopter screw (or any stone on the end of string) breaks ether rays directed to Earth, and it at once answers by  $\beta$ -stream in this place. Thanks to the ether area above helicopter is more dense than one under it. Moreover,  $\beta$ -things (which always fly in sky) cover helicopter (or stone) from below, change balance of its internal order, and direct it in sky.  $\beta$ -streams consist of odd  $\beta$ -systems, and they scatter in sides. Since that the helicopters can fly near Earth (at least near a top of mountain).

Many significant practical tasks (design of electromagnetic processes in chemical and biological systems, optical ones, mind activity imaging in  $\beta$ -fields and other) are carried out by  $P^\lambda$  means as simple arithmetical actions in mechanics  $P^\lambda$  owing to might of hierarchical mathematics  $A^\lambda$ .

#### 4 LINKS WITH KNOWN THEORIES

It is easy to see that new mechanics of natural systems is strongly linked with facts of practice. And it looks wide of known theories which are working in this area. However  $P^\lambda$  takes into account their lacks and achievements.

The lacks are in their foundations. Till now exact definitions of the main means of practical mathematics –

angles, dimensions, number codes

are unknown in these theories.

Theory of function of one and many complex variables (the most beautiful among other ones), in fact, is good endeavour to define angles exactly – as members of acts (+) and ( $\times$ ). But they are defines round-about, by their functions ( $\cos(t)+i\sin(t)$ ), and theory is tangled. (Angles must be defined directly – by one number.)

The best known definition of geometrical dimensions is space covering by simplex areas, suggested by H. Lebesgue. This areas are members of acts (+) and ( $\times$ ) in hierarchical mathematics  $A^\lambda$ . Huge expenses of larger scale practical directions (engineering design, navigation systems and other) to define geometrical dimensions by knowledge theories are vain.

Integrals (grounded, beginning with Archimedes, on ancient mechanical way: to immerse one pan of scales in order, to raise a weight by other pan of scales, are the way to increase dimensions of functions – polynomial degrees. But the degrees can not be regarded as geometrical dimensions. And the way of their increasing is infinite dividing of interval into smaller intervals (the same dimension) which allows to see in the end a point (lowest dimension without contents) and to return

back by infinite uniting. It is long and hazy way, where the main note of derivative function  $(f(x+\Delta x)-f(x))/\Delta x$  is not too correct (addition of polynomial functions is defined in one the same point for both functions, while  $(x)$  and  $(\Delta x)$  are diverse points).

This note is symbol of system link with other one which changes its activity – turns it on angle (dimensions grow in places of changing). The uncertainty of named symbol is reasoned by lack of links definition in given theory which can work mainly with linear systems (hierarchical systems are nonlinear by their nature).

Own strata of numbers (natural, integer, real, complex&hypercomplex) together with linear spaces (directed numbers able to be turned on angle) are regarded as algebra structures. These structures are closed in their initial sets&acts and algebra has not means in order to define polynomial degrees increasing by integrals, not to mention – to widen integer numbers to real and imaginary ones. Number codes (where dimensions grow easy) are beyond it abilities.

Number codes actually can not be defined by known (one level) theories. At first this fact was marked by H. Lebesgue – moreover, he guessed that all other known theories may be described by number codes. Then H. Simon made an endeavour to define number codes by his system. (System by H. Simon must have internal connections stronger than ones with other systems in its environment. This law does not work in hierarchical systems, including number codes. where systems are linked by their authority stronger than they are able to link their own lower strata.)

$\Lambda^\lambda$  mathematics suggests exact definitions of angles, dimensions and number codes together with other mathematical means significant in process of measuring natural systems  $^0\alpha$  fields and changing them in order to improve the highest strata activity – scheme  $\alpha^\lambda | \Lambda^\lambda$  of hierarchical arithmetic  $\Lambda^\lambda$ .

At the same time the scheme  $\alpha^\lambda | \Lambda^\lambda$  contains and connects many achievements of known theories.

$\alpha^\lambda | \Lambda^\lambda$  defines history of numbers (with natural to real, complex&hypercomp;ex (imaginary numbers are defined by ort  $^{10}\beta\Lambda$ )). It means that acts  $\rho^\lambda$  define all function of one and many complex variables (their space is  $^-\Lambda$  which is like to Hilbert one). Cons  $(+\infty)$  and  $(-\infty)$  of one ort are connected in  $\Lambda^\lambda$  (as well as in Riemann geometry and in technical systems – arithmetical processors). Two complex surfaces are contact in one point, and the like.

Mechanical functions  $\{\rho_\tau^\lambda\}$  are similar to integrals by Archimedes. But  $\rho^\lambda$  are able to immerse into contents of lower dimensions and to raise new dimensions by one act with only 3 tacts (by mach  $\leftrightarrow$ ), and this act is number, member of arithmetical acts  $(+)$  and  $(\times)$ . The list of links with known theories is mach more long than it is allowed by requirements to length of paper text, and many of them may be considered in other text, as well as links of mechanical slang (with mathematical grammar:  $\{\beta mach_\tau^\lambda, \beta ort^\lambda, \dots\}$ ) and natural languages.

## 5 CONCLUSION

The main merits of hierarchical mechanics, suggested in this paper, are its simplicity and coherence. And above all – its ability to see new horizons of science&practice.

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# THE PRACTICAL TASKS OF HIERARCHICAL MECHANICS: CHEMICAL NUCLEI SIMULATING, TSUNAMI IMAGES, AND OTHER<sup>1</sup>

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Abstract: Hierarchical mechanics  $P^\lambda$  is practical direction of new mathematics  $A^\lambda$  of hierarchical systems which allow to carry out known heavy tasks by simple way (cohered with requirements of cybernetical systems (design&learning)) and to see new systems and processes. The article deals with two practical tasks: simulation of chemical nucleus and wave in water (including tsunami and standing waves). These tasks belong to diverse areas of knowledge, but they carried out by similar means of mechanics  $P^\lambda$ . Suggested simulation discovers new side of named systems and processes.

Keywords: hierarchical mathematics, mechanics, chemical nucleus, water waves, tsunami.

## 1 THE TASK

The article grounded on hierarchical mathematics  $A^\lambda$  (Novikava et al., 1998) [originated by works of M.Mesarovic and Y.Takahara (Mesarovich et al., 1970; Mesarovich and Takahara, 1975)] and mechanics  $P^\lambda$  suggested in paper “Hierarchical mechanics of natural systems” by S.Novikava (Novikava et al., 2008). Mechanics  $P^\lambda$  is hierarchical cybernetics applied to natural fields&systems. Their images in  $P^\lambda$  are simple connected schemes, and any system image contains definitions of its contents (linked systems of lower strata (levels), and its activity as whole thing in its environment (other systems of its own level), and its holding systems (its authority). These definitions allow to carry out the main cybernetical tasks (design&learning) in any vagueness of knowledge.

The article considers two significant practical tasks which have not exact mathematical definitions in other theories. They are:

- 1.chemical nucleus simulation, including its arising, activity, ways of its construction changing (radioactive decay,  $\alpha$  and  $\beta$  radioactive reactions, nucleus changing without fission), links of nuclear geometry with one of higher chemical systems (crystals, thin films, and the like);

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- water waves images, including tsunami and standing waves which connect the waves origins and their changing geometry&activity in diverse environments (on diverse bottom reliefs, on long beaches, around little islands).

Suggested images of considered systems meet all requirements of practical cybernetics and may be applied in processes of design&learning of named systems and other ones – chemical reactors, nanotechnologies, protective constructions on sea shores.

## 2 GENERAL SCHEME OF HIERARCHICAL MECHANICS

Mechanics  $P^\lambda$  is defined by 1)  $\alpha^\lambda$  - original mathematical image of hierarchical systems, and 2)  $\Lambda^\lambda$  – hierarchical arithmetics – system of hierarchical numbers  $\lambda_\tau$  with acts  $\oplus^\lambda$  and  $\otimes^\lambda$  which answer to main mechanical processes.

1)

$$\begin{aligned}
 \times \alpha^\lambda: & \quad A^\lambda \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \lambda \\ \omega A_\rho \sigma \end{matrix} \right\}^\lambda \xrightarrow[\rho]{A^\lambda} \beta \\
 \Lambda^\lambda & \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \Lambda^\lambda \\ \omega \Lambda_\rho \sigma \end{matrix} \right\}^\lambda \xrightarrow[\rho]{\Lambda^\lambda} \beta & \quad P^\lambda \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma P^\lambda \\ \omega P_\rho \sigma \end{matrix} \right\}^\lambda \xrightarrow[\rho]{P^\lambda} \beta & \quad \Gamma^\lambda \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \Gamma^\lambda \\ \omega \Gamma_\rho \sigma \end{matrix} \right\}^\lambda \xrightarrow[\rho]{\Gamma^\lambda} \beta \\
 \Omega^\lambda & \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \Omega^\lambda \\ \omega \Omega_\rho \sigma \end{matrix} \right\}^\lambda \xrightarrow[\rho]{\Omega^\lambda} \beta & \quad \Sigma^\lambda \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \Sigma^\lambda \\ \omega \Sigma_\rho \sigma \end{matrix} \right\}^\lambda \xrightarrow[\rho]{\Sigma^\lambda} \beta & \quad B^\lambda \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma B^\lambda \\ \omega B_\rho \sigma \end{matrix} \right\}^\lambda \xrightarrow[\rho]{B^\lambda} \beta \\
 A^\beta & \xleftarrow[\rho]{\gamma} \left\{ \begin{matrix} ?^\gamma \\ \omega A_\rho \sigma \end{matrix} \right\}^\beta \xrightarrow[\rho]{A^\beta} ?
 \end{aligned}$$

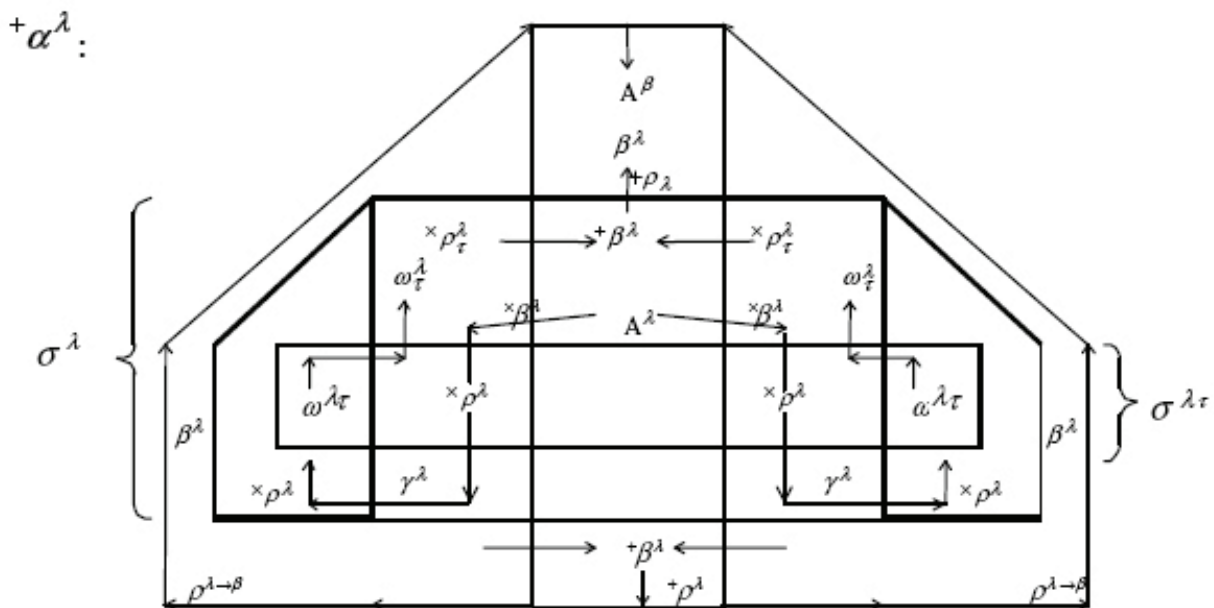


Fig. 1 Mathematical images  $\times \alpha^\lambda$  and  $+\alpha^\lambda$  of hierarchical systems.

$$\begin{aligned}
A^\lambda &\leftrightarrow \omega_0^\lambda, \lambda \rightarrow \beta, \beta^\lambda \leftrightarrow \infty^\lambda \rightarrow 0^\beta; \lambda_\tau \rightarrow \lambda; \\
\rho^\lambda &\leftrightarrow \{\leftarrow \rightarrow^\lambda\} \leftrightarrow \{\oplus^{\lambda_\tau}, \otimes^\lambda, \oplus^\lambda\} \leftrightarrow \{^+ \rho^{\lambda_\tau}, \times \rho^\lambda, ^+ \rho^\lambda\}; \\
^+ \rho^{\lambda_\tau} &\leftrightarrow ^+ \rho_{\sigma \rightarrow \omega}^{\lambda_\tau \rightarrow \lambda}: \sigma^{\lambda_\tau} \rightarrow \{\beta^{\lambda_\tau}\} \rightarrow \omega_0^\lambda, \sigma^{\lambda_\tau} \leftrightarrow \{\omega_\tau^{\lambda_\tau}, \gamma_\sigma^{\lambda_\tau}\}; \\
\times \rho^\lambda &\leftrightarrow \times \rho_{\omega \rightarrow \sigma}^\lambda: \omega_0^\lambda \rightarrow \sigma^\lambda, \sigma^\lambda \leftrightarrow \{\omega_\tau^\lambda, \gamma_\sigma^\lambda\}, \omega_\tau^\lambda \leftrightarrow \{\omega_{0\tau}^\lambda, \sigma_\tau^\lambda \rightarrow \beta_\tau^\lambda\}; \\
^+ \rho^\lambda &\leftrightarrow ^+ \rho_{\sigma \rightarrow \omega}^\lambda: \sigma^\lambda \rightarrow \{\beta^\lambda\} \rightarrow \omega_0^\beta; \\
A^\beta &\leftrightarrow \omega_0^\beta, \beta^\beta \leftrightarrow \infty^\beta
\end{aligned}$$

$A^\lambda$  – original sway (authority) of time  $\lambda$ ;

$\lambda$  – level (time),  $\lambda_\tau$  - lower levels (strata), time earlier than  $\lambda$ , ...;

$\rho$  – act (process, technology, ...);

$\gamma$  – link (connection, measure, order, ...);

$\omega$  – single system (thing, detail, ...);

$\sigma$  – field (plural number, contents, construction, ...);

$\beta$  – hierarchical haze (vagueness, chaos, ...), sign of dimensions of time  $\lambda$ , sign of new (arising) time;

$A^\lambda, \omega_0^\beta$  – metaauthority of time  $\lambda$ , origin of new time  $\beta$ .

2)  $\alpha^\lambda | \Lambda^\lambda$

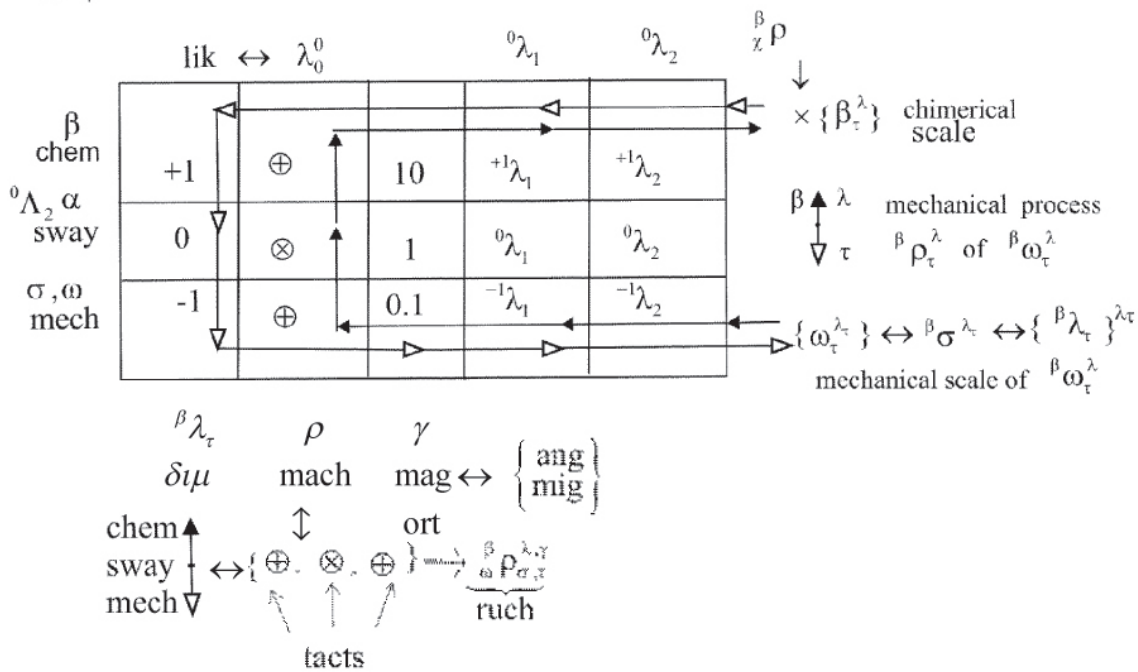


Fig.2. Hierarchical numbers  $\{\beta lik_\tau^\lambda\}$  – numerical measures of mechanics  $P^\lambda$ .

$A^\lambda$  is original system (original number  ${}^0 1_0 \leftrightarrow \beta \lambda_0$ ) of hierarchical arithmetic  $\Lambda^\lambda$ ;

$\{\beta \lambda_\tau\}$  – multiplied original number;  $\{\beta \uparrow \lambda_\tau\}$  – symbol of  $A^\lambda$  as mechanical process in hierarchical systems (including numbers  $\beta \lambda_\tau$ );  $\{\beta \omega mech_\tau^\lambda, {}^0 ruch_\tau^\lambda, \dots\}$  – mechanical slang with mathematical grammar (symbols of  $A^\lambda$  strata as sings allow to have any meaning of root lexical units:  ${}^\beta \omega ort_\tau^{\lambda_\tau}$  –

ort of earlier time  $\lambda_\tau$ , which belongs to system  $\omega^{\lambda_\tau}$ , has meta authority (aim, arising sway)  $\beta^{\lambda_\tau}$ , and the like). (Fig.2. is fragment of arithmetic  $\Lambda^\lambda$ .)

### 3 IMAGES OF NATURAL FIELDS&SYSTEMS IN MECHANICS $P^\lambda$

${}^\beta \sigma_\tau^{\lambda_\tau}$  – field of ether;

${}^\beta \omega_\tau^{\lambda_\tau}$  – ether thing;  $\beta \leftrightarrow \lambda_\tau$  – symbol of  $\omega_\tau^{\lambda_\tau}$  as process;

fields of charges and magnetic one consist of ether things with dimensions

$\beta (\omega_\tau^{\lambda_\tau}) \leftrightarrow \delta\mu (\omega_\tau^{\lambda_\tau}) \leftrightarrow 10^{\lambda_\tau}$ ; dimension of gravitational field is  $\delta\mu (\omega_\tau^{\lambda_\tau}) \leftrightarrow 100^{\lambda_\tau}$ ;

${}^0 \omega_0^\lambda$  – original sway (original system) of time  $\lambda$ ;  $\delta\mu (\omega_0^\lambda) \leftrightarrow 1000^{\lambda_\tau} \leftrightarrow 0^\lambda \leftrightarrow \dim(\omega_0^\lambda) \leftrightarrow 3$ ,

$\text{mag}(\omega_0^\lambda) \leftrightarrow 1 \text{ angstrom} \leftrightarrow \text{ang}_0^\lambda \sim 10^{-8} \text{ sm}$ ;

$\{ {}^0 \omega_\tau^\lambda \} \leftrightarrow \sigma_0^\lambda$  – multiplied original system, field of technical (ordinary) systems of time  $\lambda$ ;

${}^0 \omega_\tau^\lambda$  – proton; any proton has sway system  ${}^0 \omega_{0\tau}^\lambda$  – signal of original authority  ${}^0 \omega_0^\lambda$  ( $\dim({}^0 \omega_{0\tau}^\lambda) \leftrightarrow 3$ ,  $\text{mag}({}^0 \omega_{0\tau}^\lambda) \leftrightarrow 0.001 \text{ mag}({}^0 \omega_0^\lambda)$ ), mechanical ( ${}^\beta \sigma_\tau^{\lambda_\tau}$ ) and chimerical ( $\{ \beta_\tau^\lambda \}$ ) scales, mechanical process, which turns mech scale  $\sigma_\tau^\lambda$  (ether) into chem. scale  $\{ \beta_\tau^\lambda \}$  – hierarchical haze of time  $\lambda$  ( $\dim(\beta_\tau^\lambda) \leftrightarrow 3$ ,  $\text{mag}(\beta_\tau^\lambda) \leftrightarrow 1^0 \text{ ang}_0^\lambda \leftrightarrow \text{mag}(\omega_0^\lambda) {}^0 \rho_\tau^\lambda$  has own contents  ${}^0 \rho_\tau^\lambda \leftrightarrow {}^0 \{ \oplus^{\lambda_\tau}, \otimes^{\lambda_\tau}, \oplus^{\lambda_\tau} \}_\tau^\lambda \leftrightarrow {}^0 \{ \rho^{\lambda_\tau}, \times^{\lambda_\tau}, +^{\lambda_\tau} \}_\tau^\lambda$  – tacts of  ${}^0 \rho_\tau^\lambda \leftrightarrow {}^0 \text{mach}_\tau^\lambda$ ;

charge of proton  ${}^0 \omega_\tau^\lambda$  is tact  $+ \rho_\tau^{\lambda_\tau} \leftrightarrow {}^0 \oplus^{\lambda_\tau}$  of  ${}^0 \rho_\tau^\lambda$ ;

tact  $+ \rho_\tau^{\lambda_\tau}$  orders (organizes)  ${}^\beta \sigma_\tau^{\lambda_\tau} \leftrightarrow {}^0 \text{mech}_\tau^\lambda$ ; it defines dimensions and directions of ether things  $\{ {}^\beta \omega_i^{\lambda_\tau} \} \leftrightarrow \{ \nabla_i \}_\tau^{\lambda_\tau}$ ,  $i \leftrightarrow \{ 0, \dots, 100 \}^{\lambda_\tau}$ ,  $100^{\lambda_\tau} \leftrightarrow {}^\beta \text{con}^{\lambda_\tau}$  – number of ether in any layer of mech scale; any  ${}^\beta \omega_{\alpha}^{\lambda_\tau}$  organizes following ether thing in ray  $\iota$  (directed with centre  ${}^0 \omega_{0\tau}^\lambda$  to  ${}^\beta \omega_{\alpha}^{\lambda_\tau}$  and to following ether in this ray);  ${}^\beta \omega_{\alpha}^{\lambda_\tau}$  (ordered by sway signal  $\gamma_{0\tau}^\lambda | {}^\beta \omega_{\alpha}^{\lambda_\tau}$  of own authority of proton) orders its ray by this signal as by its own one; it makes that by its own tact of charge  $+ \rho_{\alpha}^{\lambda_\tau}$ ;

measure of charge (simplest bearer of charge (magnetic, gravitational) order) is ether thing  $\nabla_i$ ; general measure of order of mech scale  ${}^\beta \sigma_\tau^{\lambda_\tau}$  is  $100^{\lambda_\tau}$ .  $\nabla_i \leftrightarrow {}^0 1^\lambda$  charge (if  $\beta \leftrightarrow 10^{\lambda_\tau}$ ) or  ${}^0 1^\lambda$  grave (if  $\beta \leftrightarrow 100^{\lambda_\tau}$ );

process of charge (magnetic, gravitational) order multiplying in ether field  $\sigma^{\lambda_\tau}$  is wave of order with

$${}^\beta \text{ruch}_\tau^{\lambda_\tau} \leftrightarrow {}^{10} \text{ang}_\tau^{\lambda_\tau} / \text{mig}^{\lambda_\tau} \leftrightarrow {}^0 1_0^\lambda \text{ ang} / \text{mig} \tilde{\leftrightarrow} 300\,000 \text{ km/sec}$$

wave of order does not bring photons, it changes internal order  ${}^\beta \gamma_{\alpha}^{\lambda_{\tau}}$  of ether things  ${}^\beta \omega_{\alpha}^{\lambda_{\tau}}$  on their rays; order between rays is old; it means that density of charge (magnetic, gravitational) order decreases

with square of distance from proton; distance is measured by  ${}^\beta \text{ruch}^{\lambda_{\tau}}$ , this ruch is general measure of multiplying processes in ether, defined by its authority  ${}^0 \omega_0^{\lambda} \leftrightarrow {}^{1000} \omega^{\lambda_{\tau}}$  in time  $\lambda_{\tau}$ ;

mech scale  ${}^\beta \sigma_{\tau}^{\lambda_{\tau}}$  of proton  ${}^0 \omega_{\tau}^{\lambda_{\tau}}$  has  $\nu$  layers (now  $\nu \sim 2000$ ) which act together; any layer can not contain more than  ${}^\beta \text{con}^{\lambda_{\tau}} \leftrightarrow 100^{\lambda_{\tau}}$  ether things; nevertheless, if K new ether things prove to be its zone, they are included into  $\sigma_{\tau}^{\lambda_{\tau}}$ ; its magnitude outnumbers its  ${}^\beta \text{con}^{\lambda_{\tau}}$ , and K old ether things of  $\sigma_{\tau}^{\lambda_{\tau}}$  are turned into K systems  $\beta_{\tau}^{\lambda}$ ; it is made by other tacts  ${}^0 \{ \times \rho^{\lambda}, + \rho^{\lambda} \}_{\tau}$  of  ${}^0 \rho_{\tau}^{\lambda}$ ;

1 layer of mech scale can include  $K \leftrightarrow 1$  new ether thing in 1 mig;  $\nu$  layers cab include  $K \leftrightarrow \nu$  things at once, and make K systems  $\beta_{\tau}^{\lambda}$ ; ether thing is included ahead proton and  $\beta$ -thing arises behind it; magnitude of  $\beta_{\tau}^{\lambda}$  in  $1000^{\lambda_{\tau}}$  times more than one of proton, and when  $\beta_{\tau}^{\lambda}$  arises, it rearranges its proton on 1 angstrom/mig in direction where new ether thing was included; it is new ruch  ${}^0 \rho_{\tau}^{\lambda} \leftrightarrow {}^0 \text{ruch}_{\tau}^{\lambda}$  of time  $\lambda$ ;  ${}^0 \text{ruch}_{\tau}^{\lambda} \leftrightarrow 1$  ang/1 mig; but proton includes ether things in diverse places of mech scale and it can keep balance of rearrangements ("rest"); when one its side is more active, it selects this side as direction of its  ${}^0 \text{ruch}_{\tau}^{\lambda}$  which always less than 300 000 km/sec;

when K ether things (linked in line of length K angstrom) are included into mech scale  ${}^\beta \sigma_{\tau}^{\lambda_{\tau}}$  of proton, their old place in ether attracts new line of K ether things which are rearranged in this place, and new ruch arises in ether, it is counter ruch  $- {}^0 \rho_{\tau}^{\lambda} \leftrightarrow - {}^0 \text{ruch}_{\tau}^{\lambda}$  of time  $\lambda$ ; counter ruch is directed to proton, but wave of ether lines rearrangements runs away proton (along its new ray); it is radio wave; length of this way is K ang, its ruch is habitual in ether (300 000 km/sec);

when proton leaves its place, its radio wave does not change initial measures; counter ruch is directed to old place of proton (place of  ${}^0 \rho_{\tau}^{\lambda}$  arising); its characteristics may be changed in its way by other systems;

measuring unit of weight (or inertia) of proton is  $1 {}^0 \text{mech}^{\lambda}$  – one layer of mechanical scale; weight proton now is  $\sim 2000 {}^0 \text{mech}^{\lambda}$ ; unlike charge, weight is own measure of time  $\lambda$ , reasoned by tacts  ${}^0 \{ \times \rho^{\lambda}, + \rho^{\lambda} \}_{\tau}$  of  ${}^0 \rho_{\tau}^{\lambda}$  where its chimerical scale  $\{ \beta_{\tau}^{\lambda} \} \leftrightarrow \{ {}^0 \text{chem}_{\tau}^{\lambda} \}$  grows;

layers of mech scale can act as individual systems of time  $\lambda$ ; 1 layer – as electron ( ${}^0 \nu^{\lambda}$ ), positron ( ${}^0 \bar{\nu}^{\lambda}$ ), photon ( ${}^0 \nu^{\lambda}$ ), neutrino ( ${}^0 \nu^{\lambda}, {}^0 \bar{\nu}^{\lambda}$ );  $\mu$ -ons,  $\pi$ -ons and other fragments (splinters) of proton have more than 1 layer; neutron is proton in electron scale whose dimension ( $10^{\lambda_{\tau}}$ ) is growing to gravitational one ( $100^{\lambda_{\tau}}$ ) and direction is turned (charge is locked in scale and wanes in environment); antiproton is neutron in positron scale;

photon can include only 1 ether thing in one the same its place; since that its ruch is 300 000 km/sec in one direction (there are no ruchs in other sides); its own wave is short (1 ang); but its source (proton or other system) is changed before photon arising, and this changing raises its radio wave (more long); the wave runs ahead photon and defines its color; photon without radio wave is gamma quantum;

mech scale of neutrons or neutral atoms, organized by gravitational order, can not include new ether things; places of including are charged zones (charged holes in this scale, poles); gravitational field (system of gravi-rays in ether  $\sigma^{\lambda\tau}$ ) around neutral system does not attract or repel other systems; but ether areas of lower dimensions between gravi-rays have high density (caused by systems activity when they were charged); this density is attractive for systems flying by;

locked gravi-zones arise between protons in stars when they change dimensions of mech scales of one another;

very high dimensions of gravi-zones ( $100^{\lambda\tau}$ ) are near to ones ( $1000^{\lambda\tau}$ ) of sway systems of protons, and these zones are good bridges between sway systems which allow to manage their mechanical activity as two ways links in nucleus;

grave-bridges can not be attractive for alien charged systems; direction of ether things of bridges are locked in gravi-zones and charged system, which draws near the bridge, considers it as place without ether; this system at once changes the directions of orts within it and ruchs away as if gravi-zone repels it; hence, gravi-bridges can exist long time as stable and strong nuclear links;

ether things in gravi-zones are able to be turned on angles; since that the gravi-bridges are lithe and allow to organize changing geometry of chemical nucleus which, in its turn, is a reason of geometry of crystals, biological constructions and other systems of higher strata;

in this way the simulation of chemical nucleus in hierarchical mechanics  $P^\lambda$  is much more simple and rich than one in other theories, where nucleus must include neutrons (since charge is only integer number) and super strong links of unknown nature, and it must have unaccountable repulsive shell, and its connections with geometry of crystals are unaccountable as well as many other facts.

#### 4 MECHANICS OF CHEMICAL NUCLEI

Mechanics  ${}^0P_1^\lambda$  of chemical nuclei is arithmetic&geometry of beginning chemical dimension of time  $\lambda$  which will grow till biological dimension  ${}^0P_{10}^\lambda \leftrightarrow {}^{10}P_0^\lambda$  and then – till higher dimensions: demographical mechanics  ${}^{100}P^\lambda$  and mechanics of knowledge  ${}^{1000}P^\lambda$  – hierarchical cybernetics.

Original authority of chemical dimension  $0^\lambda$  of time  $\lambda$  is geometrically 3-dim charged system  ${}^0\omega_\tau^\lambda$  whose main task is turning ether  $\sigma^{\lambda\tau}$  into field of haze  $\beta^\lambda$ .

After its multiplying the new field  $\sigma^\lambda$  of 3-dim charged technical (ordinary) systems  ${}^0\omega_\tau^\lambda$  of time  $\lambda$  (protons) has new task. Together with turning of their mech scales  $\sigma_\tau^{\lambda\tau}$  (ether areas) into chimerical ones  $\beta_\tau^\lambda$  (hazy zones) the new technical systems must begin ordering of their chem scales  $\beta_\tau^\lambda$ .

Hazy zones  $\beta^\lambda$  are strongly connected with their sway systems  ${}^0\omega_{0\tau}^\lambda$  by non geometrical links. But geometry is one of the main measures of time  $\lambda$ , and it is way of organization of ordinary systems  ${}^0\omega_\tau^\lambda$  by their mechanical scales. This way at first was star technology of chemical nuclei merging (Novikava et al., 2008). Now  ${}^0\rho_{star}^\lambda$  may be simulated by technical means. Fig 3 is its simulation  ${}^{1000}_\beta\rho_{laser}^\lambda$  by laser beams.

Fig.3 belongs to chemical arithmetic  ${}^0\Lambda_0^\lambda$ : process  ${}^{1000}_\beta\rho_l^\lambda$  is act  ${}^0\oplus_\tau^\lambda$  within ort  ${}^0\Lambda_0^\lambda \leftrightarrow {}^0\Gamma_0^\lambda$  whose new sway system  ${}^0\lambda_{10}^\lambda \leftrightarrow {}^0\omega_{10}^\lambda \leftrightarrow {}^{10}\omega_0^\lambda \leftrightarrow {}^{10}\lambda_0^\lambda$  (biological thing) will arise in con (in the end) of chemical dimension.

This act allows to mesh protons  ${}^0\omega_1^\lambda, {}^0\omega_2^\lambda$  by  $\beta$ -things in the ends of laser beams.  $\beta$ -field hides ether rays to protons and they must (by products of ether systems in their mech scales) to grow ether dimension with  $10^{\lambda_\tau}$  (dim of charge) to  $100^{\lambda_\tau}$  (dim of gravi-field).

Single proton is hydrogen nucleus  ${}^{0+0}_1\sigma_1^\lambda \leftrightarrow 0^\lambda \delta\mu$  simplex of time  $\lambda$ . As alone  $0^\lambda \delta\mu$  simplex it has numbers  ${}^{0+0}0$  and  ${}^{0+0}10$  in ort  ${}^{0+0}\Lambda_0^\lambda$ . At the same time  ${}^{0+0}_1\sigma_1^\lambda$  is  $1^\lambda \delta\mu$  simplex number – origin of line:

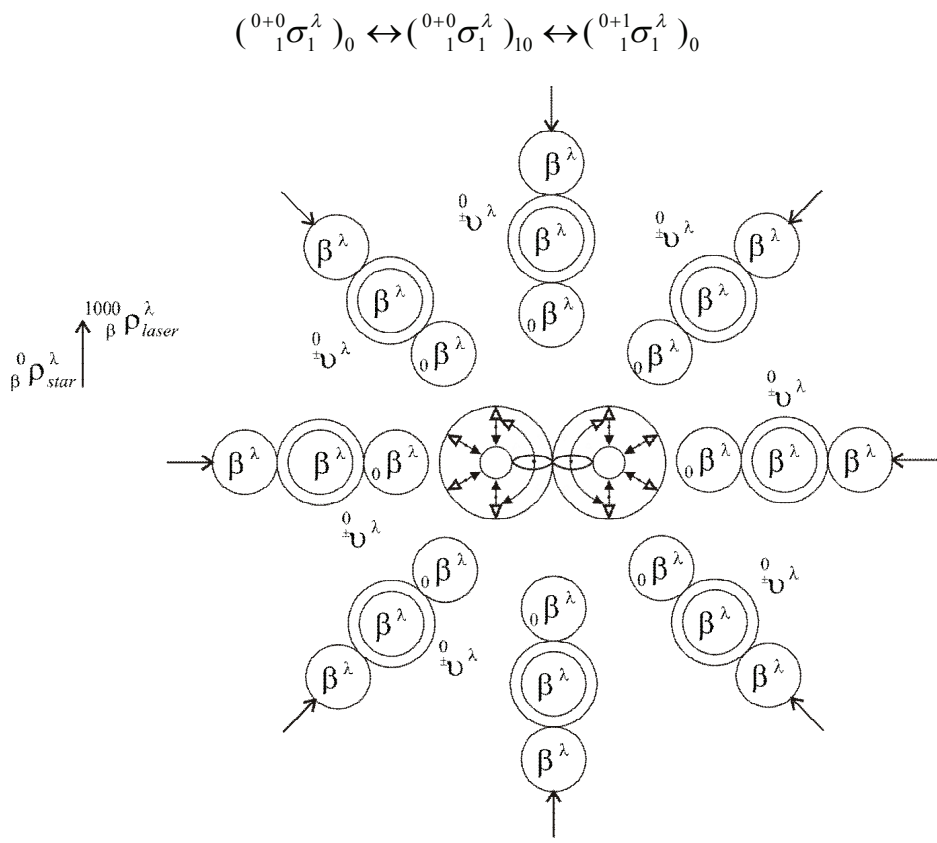


Fig.3. Simulation of start technology of chemical nuclei  $\{ {}^0\omega_\tau^\lambda \}$  merging by laser beams  $\{ {}^\pm\upsilon^\lambda \}$ .

2 protons  ${}^{0+0}_1\sigma_{1,1}^\lambda, {}^{0+0}_1\sigma_{1,2}^\lambda$  linked by gravi-bridge ( $\gamma$ -bridge) are members of  $1^\lambda \delta i\mu$  simplex  $({}^{0+1}_1\sigma_2^\lambda)_1$  – simple line, number  ${}^{0+1}1$  and  ${}^{0+1}10_1$  (heavy hydrogen, deuterium). 3 linked protons (tritium) are members of line with 2  $\gamma$ -bridges (no simplex as line):

$$\begin{aligned} &({}^{0+1}_1\sigma_2^\lambda) \leftrightarrow ({}^{0+1}_1\sigma_2^\lambda)_{10_1}, ({}^{0+1}_1\sigma_3^\lambda)_2 \leftrightarrow ({}^{0+1}_1\sigma_3^\lambda)_{10_2} \\ &({}^{0+1}_1\sigma_2^\lambda)_{10_1} \leftrightarrow ({}^{0+2}_1\sigma_2^\lambda)_{0_1}, ({}^{0+1}_1\sigma_3^\lambda)_{10_2} \leftrightarrow ({}^{0+2}_1\sigma_3^\lambda)_{0_2} \end{aligned}$$

$({}^{0+2}_1\sigma_2^\lambda)_{0_1}$  and  $({}^{0+2}_1\sigma_3^\lambda)_{0_2}$  are origins of  $2^\lambda \delta i\mu$   ${}^{0+2}ort^\lambda$ ,  $({}^{0+1}_1\sigma_3^\lambda)_{0_2}$  is simplex in  $2^\lambda \delta i\mu$  field.

3 protons linked as triangle (helium<sub>3</sub>) is simplex  $({}^{0+2}_2\sigma_3^\lambda)_1$ ; 4 protons with cross wise linked  $\gamma$ -bridges (by  $\gamma$ -hinge) are square (in surface):

$$\begin{aligned} &({}^{0+2}_2\sigma_3^\lambda)_1 \leftrightarrow ({}^{0+2}_2\sigma_3^\lambda)_{10_1} \leftrightarrow ({}^{0+3}_2\sigma_3^\lambda)_{0_1} \\ &({}^{0+2}_2\sigma_4^\lambda)_2 \leftrightarrow ({}^{0+2}_2\sigma_4^\lambda)_{10_2} \leftrightarrow ({}^{0+3}_2\sigma_4^\lambda)_{0_2} \end{aligned}$$

(helium is no simplex in  $2^\lambda \delta i\mu$  field, but simplex in  $3^\lambda \delta i\mu$  field).

Simplex with number  ${}^{0+3}1$  is lithium  $({}^{0+3}_3\sigma_6^\lambda)_1$  and following figure is  $({}^{0+3}_3\sigma_7^\lambda)_2$ , then is beryllium cube and the like (fig.4).

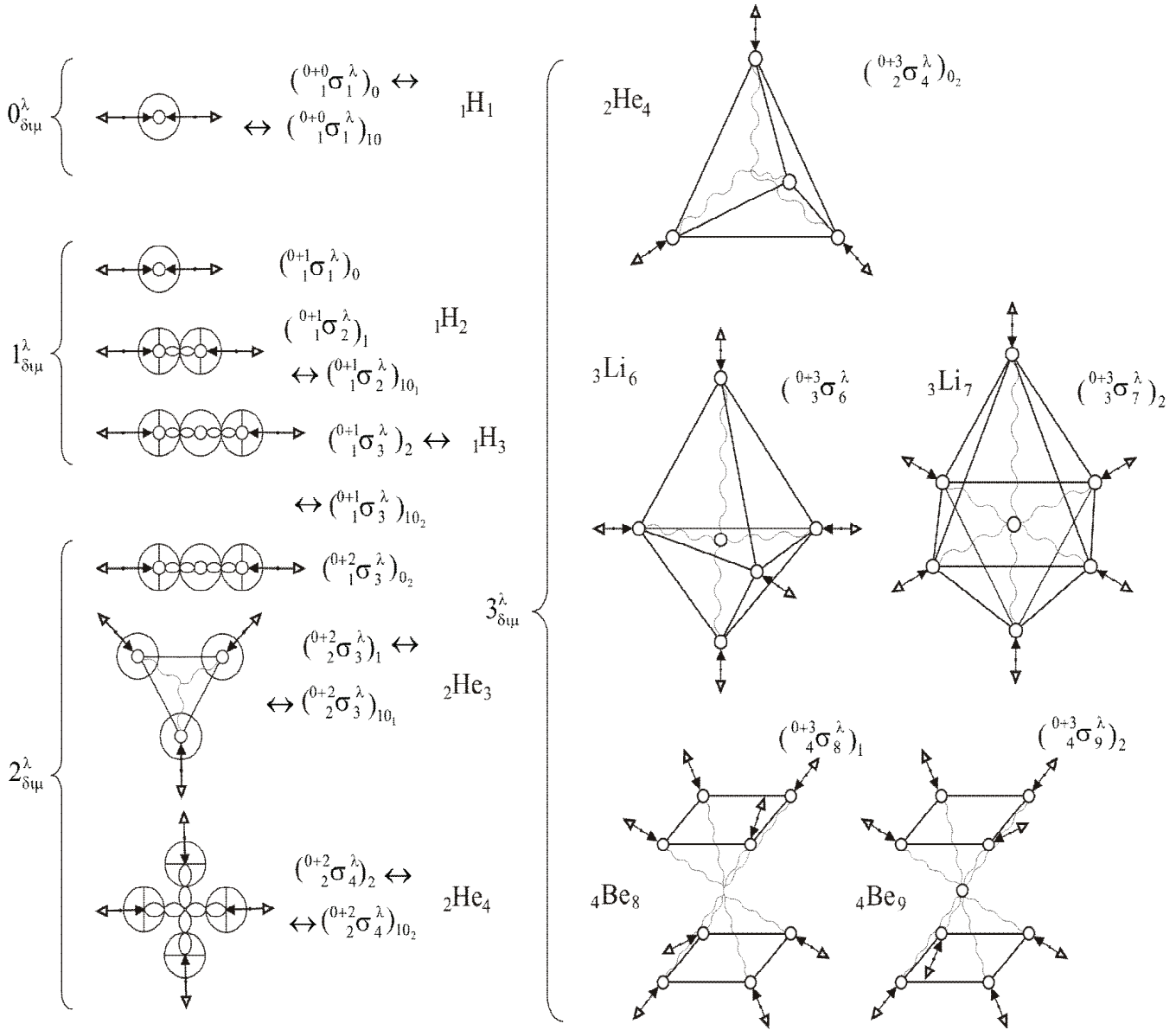
Own strata  $\{0+0, 0+1, 0+2, 0+3\}$  of chemical dimension are arithmetical and geometrical at the same time, and their note is convenient in chemical mechanics  ${}^0P^\lambda$ .

Fig.4-6 allow to connect nuclear mechanics with one of chemical reactions and materials. It is easy to see that geometrical organization of carbon nucleus define its ability to seize proton in state of crumbly materials (charcoal, graphite are black), but in crystal this ability wanes (diamond). Geometrical organization of oxygen nucleus accounts the amount of angles in its reaction with hydrogen. Chemical nuclei till  ${}_{21}Sc_{45}$  have only one hinge of their  $\gamma$ -bridges (besides tritium whose central proton may be placed in this hinge).

Owing to that they keep charge of simple systems in their constructions. Beginning with  ${}_{21}Sc_{45}$  their alone hinge (geometrical centre of their constructions) achieves its con. Following simplex may be coupled only with charged sides of nuclear members. since that: 1) growth of nuclear weight leaves behind one of charge, and 2) nuclear stability decreases (angle within nuclei can not be the same for all their members and it leads to breaks in constructions).



The most heavy nuclei lose their details. When all links of helium nucleus with heavy one are broken it is  $\alpha$ -reaction. When helium keeps the rest of its  $\gamma$ -bridge with heavy nucleus, this nucleus loses only its mechanical scales (photons, electrons, neutrino – as fragments of  $\gamma$ -bridges), but its main weight is almost no changed, and its charge increases ( $\beta$ -reaction).



$$({}_{2\sigma_4}^{0+2})_{10_2} \oplus ({}_{1\sigma_3}^{0+2})_{0_2} \rightarrow ({}_{3\sigma_7}^{0+3})_{1_2}$$

$$2 ({}_{2\sigma_4}^{0+2})_{10_2} \leftrightarrow ({}_{4\sigma_8}^{0+3})_2$$

Fig.4. Growth of dimensions in number code of chemical nuclei.

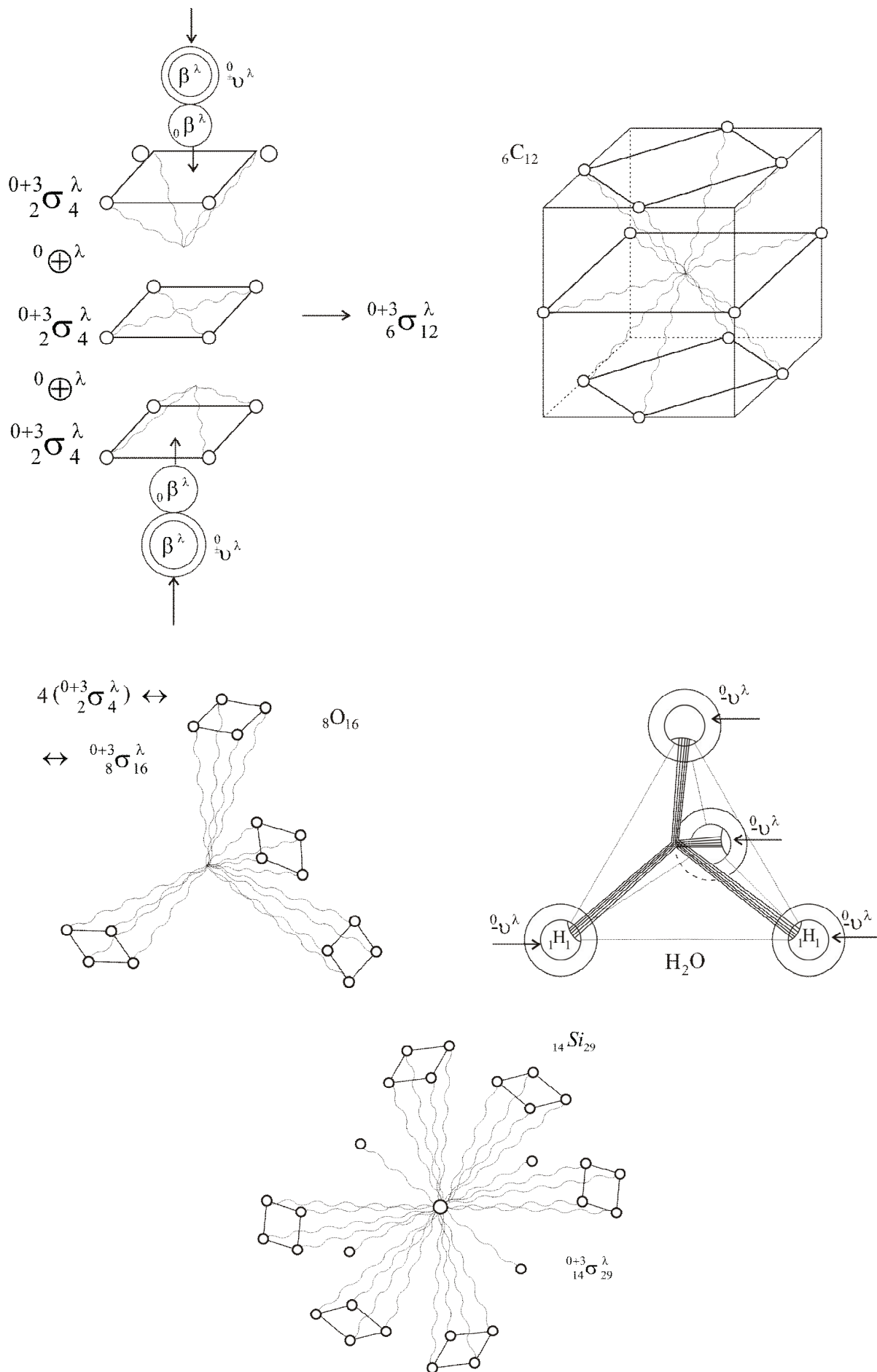


Fig.5. Carbon, oxygen and silicon: nuclear geometry allows to account their activity in crystals and in chemical reactions.

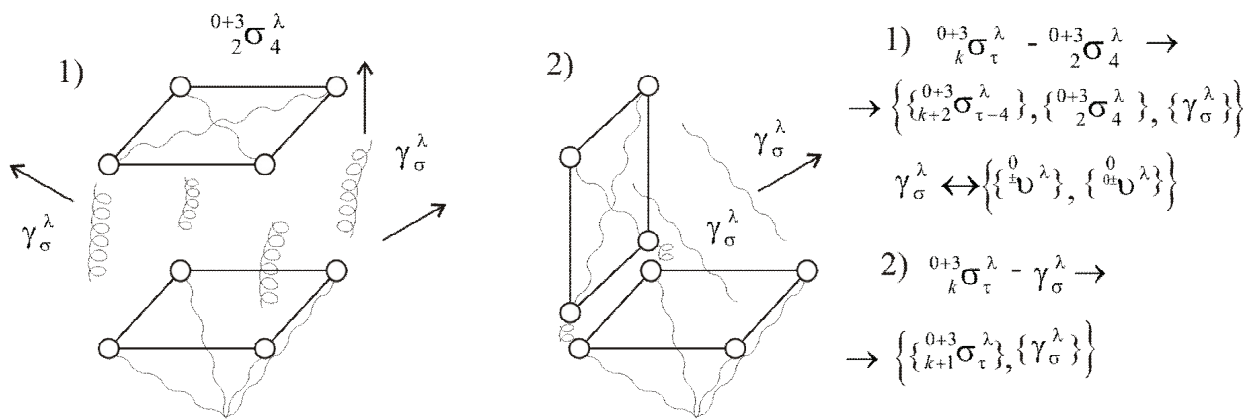


Fig.6. Radioactive reactions of heavy nuclei: 1)  $\alpha$  2)  $\beta$ .

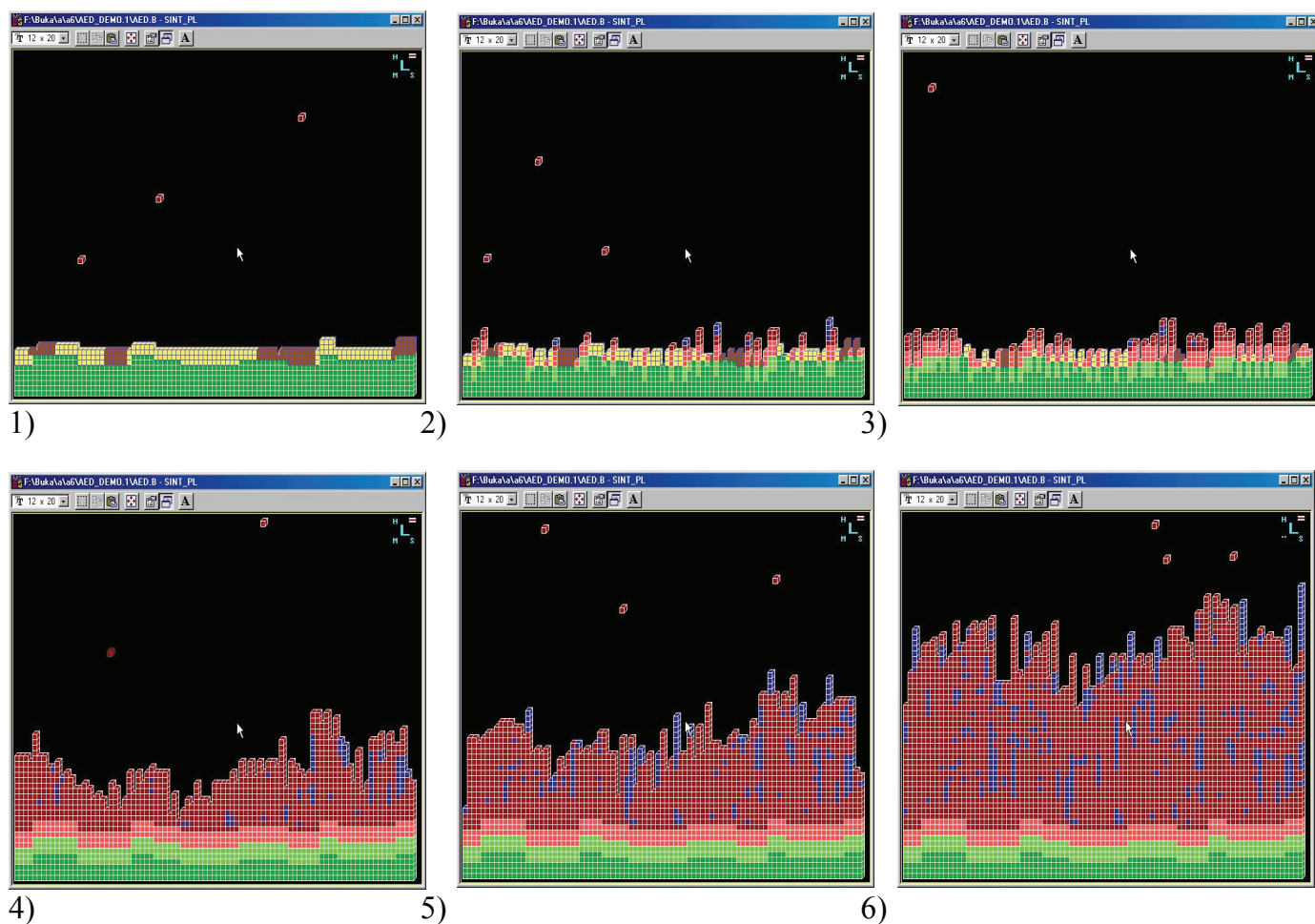


Fig.7. Simulation (in program imitation of aed-processor) technological process of epitaxial growing of film of polycrystal diamond on silicon layer.

1) Initial state: Silicon layer (with underdeveloped surface relief) is covered by thin film of silicon oxide. This layer is placed into beam of carbon atom (ions). The beam also contains necessary impurities atom (in required concentration).

2-6) First epitaxial beams crush oxide film and remove its atoms from silicon surface. After that epitaxial carbon atoms begin to settle on the layer of carbon atoms settled before. Carbon (and impurity) atoms unite forming carbon crystals construction. Surface atoms (carbon and impurity) can migrate, and crystals can rebuilt itself, which causes crystals unting and crystal size growing (this process essentially dependent on layer temperature).

Measured signs (growing times, kinetic, and states of film constructions) are good cohered with experimental data (proved by electron microscope and other methods).

Suggested simulation takes into account nuclear geometry of carbon, oxygen and silicon.

The sample of chemical mechanics of chemical nuclei (and its using for techniques and technology elaboration) see on Fig.7.

## 5 MECHANICS OF WAVES WATER: RENOVATING VAGRANT ORDER

Mechanics of chemical nuclei is measured by dimension  $(0+\tau)^\lambda$  where  $\tau$  is number of layer in star contents and history – number of nucleus in chemical table, which is – together with technology

$${}^0_{\beta} \rho_{star}^\lambda \leftrightarrow (0+\tau)_{\beta} \rho^\lambda : {}^{0+\tau} \sigma^\lambda \rightarrow {}^{1+\tau} \omega_0^\lambda$$

mathematical image of star  ${}^{1+\tau}_{\beta} \omega^\lambda$ . System  ${}^{1+\tau}_{\beta} \omega^\lambda$  has contents  $\{ {}^{0+\tau}_k \sigma^\lambda \}$  – chemical nuclei ordered by range  $(0+0)^\lambda$  - hydrogen  ${}^{0+0}_1 \sigma_1^\lambda, \dots, (0+3)^\lambda$  - helium  ${}^{0+3}_2 \sigma_4^\lambda, {}^{0+3}_2 \sigma_5^\lambda$ , and the like, till meta con of

range  $(0+\tau)^\lambda$  - the most heavy nuclei which answer to time of star bang. Original sway  $\omega_0^\lambda$  of time  $\lambda$  begins in star to yield new (meta) authority – hazy zones organized by order  ${}^{0+\tau}_{\beta} \gamma^\lambda$  and then  ${}^{1+\tau}_{\beta} \gamma^\lambda$ . Just  $\beta$ -zones are sway systems  ${}^{0+\tau}_{\beta} \omega_{0\tau}^\lambda$  and  ${}^{1+\tau}_{\beta} \omega_{0\tau}^\lambda$  in process  $(0+\tau)_{\beta} \rho^\lambda$  of nuclear dimensions growth (when new authority is immersed into old (lowest) strata and raises their dimensions), and in acts  $(0+\tau)_{\beta} \rho^\lambda$  – in stars bangs:

$$(0+\tau)_{\beta} \rho^\lambda : {}^{1+\tau} \sigma^\lambda \rightarrow {}^{2+\tau}_{\beta} \omega_{0\tau}^\lambda$$

After stars bangs the process of chemical systems gathering:

$$(1+\tau)_{\beta} \rho^\lambda : {}^{1+\tau} \sigma^\lambda \rightarrow {}^{2+\tau}_{\beta} \omega_{0\tau}^\lambda$$

begins again in new dimension  $(1+\tau)^\lambda$  - as planet mechanics  $(1+\tau)_{\beta} \rho^\lambda$  or mechanics of chemical materials. When time runs to end, its systems must be collected in certain places of general  $\beta$ -field. Geometrical nearness allows to mesh the rest ether by  $\beta$ -scales, to tie it, and to turn into  $\beta$ -things. Merging astronomic systems is lucky way to achieve this aim, and it is renovated by history of planets, where new dimensions grow as mechanism of general  $\beta$ -field ordering.

New dimensions with  $(1+\tau)^\lambda$  to  $(2+\tau)^\lambda$  is time when hazy zones are turned into acting sway of chemical material and processes. Any atom  ${}^{1+\tau}_k \sigma^\lambda$  has its contents: nucleus and electron scale  $K\{ {}^{10}_{-} \nu^\lambda_{\tau} \}$ . They are organized by  $\beta$ -zone  $\beta^\lambda_{\tau} \leftrightarrow {}^{1+\tau}_{\beta} \omega_{0\tau}^\lambda$  (may be only one  $\beta$ -thing). New sway zone define metrical magnitudes of atoms (1 angstrom and more) and their mechanical activity: places of poles (charged areas in gravi-scale), magnitudes and directions of their ruch. Chemical links  ${}^{1+\tau}_{\beta} \gamma^\lambda$  and  ${}^{2+\tau}_{\beta} \gamma^\lambda$  belong to own measures of time  $\lambda$ . They link just  $\beta$ -zone (hazy areas) of this time, turned into its authority – hidden (in chemical time), tutor (in biological and demographical systems), total – in knowledge dimension.

Sway systems  ${}^{2+\tau}_{\beta}\omega_{0\tau}^{\lambda}$  of chemical materials will be organized by links of new order  ${}^{3+\tau}_{\beta}\gamma^{\lambda}$  of biological systems

$${}^{2+\tau}_{\beta}\omega_{\tau}^{\lambda} \leftrightarrow {}^{10}_{\beta}\omega_{\tau}^{\lambda}$$

able to be multiplied by their own means in biological mechanics  ${}^{10}\rho^{\lambda}$ . Signs of new abilities of chemical systems in their way to biological ones come to light in stars history (their growth and bangs) in planets organization (stars renovating in higher dimension), in crystal growing and renovating, in water waves.

Waves in water is process

$${}^{2+\tau}_{\beta}\rho_{wave}^{\lambda} \leftrightarrow {}^{2+\tau}_{\beta}\rho_{\xi}^{\lambda} \leftrightarrow {}^{2+\tau}_{\beta}\{\times\rho, +\rho\}_{\xi}^{\lambda}$$

able to make certain  $\beta$ -zone again and again, in new (certain) places&times. There by this process allow to study and then to sway hazy zone – to make&renovate  $\beta$ -areas with prophesied characteristics.

Own range of chemical materials is:  $(1+0)^{\lambda}$  - gas,  $(1+1)^{\lambda}$  - liquid,  $(1+2)^{\lambda}$  - solid,  $(1+3)^{\lambda}$  – antecell. Gas belongs to meta con of range  $(0+\tau)^{\lambda}$  and original con of range  $(1+\tau)^{\lambda}$ . Antecell is meta con of chemical materials and original con of dimensions  $(2+\tau)^{\lambda}$  which link chemical and biological ones:  $(1+3)^{\lambda} \leftrightarrow (2+0)^{\lambda} \rightarrow (3+0)^{\lambda} \leftrightarrow 10^{\lambda}$ . Sway systems of  $(1+\tau)^{\lambda}$  belong to  $(2+\tau)^{\lambda}$ , and  $(2+\tau)^{\lambda}$  are dimensions of mature planets (as Earth). They are beyond geometrical dimensions. The range  $(1+\tau)^{\lambda}$  defines arising signs of new scale – vagueness of knowledge about chemical links which decreases with gas to solid (with chaos to certain links). However they have connections with geometry – one of the main measures of time  $\lambda$ .

Earth as chemical system  ${}^{2+\tau}_{\beta}\omega_{Earth}^{\lambda}$  is noted:

$$\begin{aligned} {}^{2+\tau}_{\beta}\omega_{Earth}^{\lambda} &\leftrightarrow {}^{2+\tau}_{\beta}\omega_{\varepsilon}^{\lambda} \leftrightarrow \{ \beta_{\varepsilon}^{\lambda} \leftrightarrow {}^{2+0}_{\beta}\omega_{\varepsilon}^{\lambda}, {}^{1+\tau}\sigma_{\varepsilon}^{\lambda} \} \\ {}^{1+\tau}\sigma_{\varepsilon}^{\lambda} &\leftrightarrow \{ {}^{1+\tau}\sigma_{\varepsilon}^{\lambda}, {}^{0+\tau}\sigma_{\varepsilon}^{\lambda}, {}^{0-\tau}\sigma_{\varepsilon}^{\lambda} \} \leftrightarrow \\ &\leftrightarrow \{ \{ 3\sigma_{\varepsilon}^{\lambda}, {}^{1+2}\sigma_{\varepsilon}^{\lambda}, {}^{1+0}\sigma_{\varepsilon}^{\lambda} \}, {}^{0+\tau}\sigma_{\varepsilon}^{\lambda}, {}^{0-\tau}\sigma_{\varepsilon}^{\lambda} \} \\ {}^{1+\tau}\mu_{\varepsilon}^{\lambda} &\leftrightarrow \mu_3 \mu_2 \mu_1 \mu_0 \mu_{00} \mu_{-\tau} |_{\varepsilon}^{\lambda} \\ {}^{\beta}\mu_{\varepsilon\tau}^{\lambda} &\leftrightarrow 0, \tau \leftrightarrow -1, 0.0, 0, 1, 2, 3. \end{aligned}$$

${}^{\beta}\mu_{\varepsilon\tau}^{\lambda}$  - measures of dimensions in multilayer geometrical organization of Earth:  $\mu_{-\tau} \leftrightarrow \mu_1$  - measure of earthly ether field  $\sigma_{\varepsilon}^{\lambda\tau} \leftrightarrow {}^{0-\tau}\sigma_{\varepsilon}^{\lambda}$ ,  $\mu_{00}$  - plasma shell (star gas near Earth),  $\mu_0$  - air,  $\mu_1$  - water,  $\mu_2$  - crust of Earth with magma within it which is considered in the images of water waves mainly as solid,  $\mu_3$  - measure of  $\beta$ -sway of Earth.

Material layers  $(1+\tau)^\lambda$  of Earth are at the same time its geometrical scales: crust with its contents – 3 dim (chemical links are certain and it acts as whole system), water scale – 2 dim (weak links), air – 1 dim (rare links), plasma shell – 0 dim (star gas with out chemical links by  $\beta$ -things), ether – {-1 dim}.

Hierarchical mechanics suggests two main images of water waves with their own nature and activity: tidal waves and tsunami.

They both make  $\beta$ -zones with highest order of chemical time, which wander – change their places and are renovated in new places – it is renovating vagrant order.

Tide process looks as whole system with certain geometry which ruchs along certain lines defined by orbits of Moon, Earth and earthly daily run.

Tsunami is large scale wave similar to all habitual waves in water whose nature is defined by wind or other strikes. Merely huge magnitude of tsunami allows to give it proper name. Owing to this magnitude the mathematical simulation of water waves is very significant practical task.

Fig. 8.1 is scheme of astronomic nature of tides in ether field of Earth, Moon and Sun; tidal waves are the highest in full moon or in eclipse.

Fig. 8.2 images mechanism  ${}^0_\beta \rho_\xi^\lambda$  of tide: ether field of Moon leads to ruch of plasma shell, air, water and earthly crust in direction to Moon;  $\beta$ -tail  $\{\beta^\lambda\}_{1,1}$  of water raises it and ether zone under  $\{\beta^\lambda\}_{1,1}$  attracts water of nearest ring which flows under hill of tide wave;  $\beta$ -tail  $\{\beta^\lambda\}_2$  of earthly crust arises on other side of Earth and raises tide wave of other nature: it is organized by  $\beta$ -field; but its geometry is similar to original wave, and it has its own ring of hollow. Fig. 8.3 is geometrical image of tide wave organized by  ${}^0_\beta \rho_\xi^\lambda$ .

Fig. 8, 9 allow to see through links of hierarchical mechanics of natural strata beginning with lowest dimensions (ether) to higher ones (chemical materials, astronomic systems) of acting time  $\lambda$ . Mathematical images (schemes) of mechanisms of water waves are noted as arithmetical acts in field of hierarchical numbers of arithmetic  $\Lambda^\lambda$  (measures  ${}^\beta \mu_\tau^\lambda \leftrightarrow {}^\beta \lambda_\tau^\lambda$  of natural strata), or acts in aed-processor – technical means of hierarchical mathematics  $A^\lambda$ .

Within one tact of wave (in time  $\Delta\tau$  when its geometry is in its con) this wave has likeness with trigonometry functions. But these functions can not define processes in wave contents ever at that time  $\Delta\tau$ , not to mention the whole tact, links of tacts, links with other natural strata (either field, early crust) and with higher dimensions – practical cybernetics (design and learning systems).

Hierarchical schemes of waves define their signs (vague till now) which are the most strongly marked in tsunami waves (owing to their magnitude):

1. wave in deep places of sea is longer and lower, and its speed is higher than near by sea shores – it is accounted by changes of angles of strikes and by law of  $\beta$ -zones renovating in tacts of wave rays;

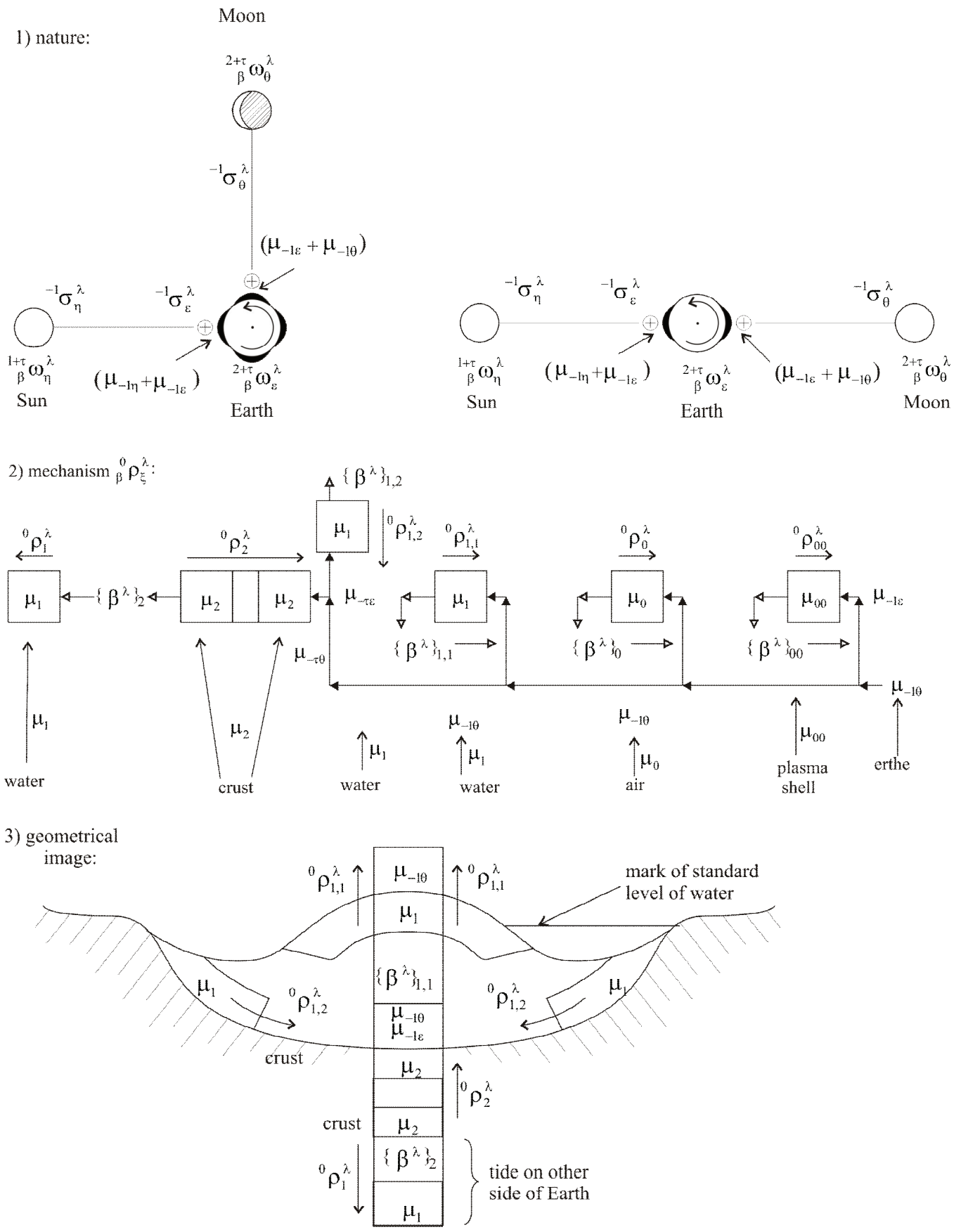
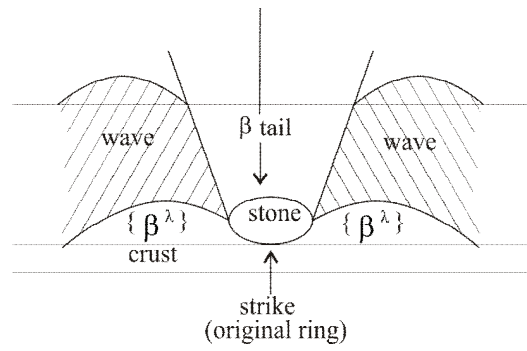
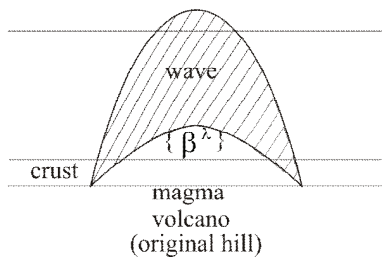
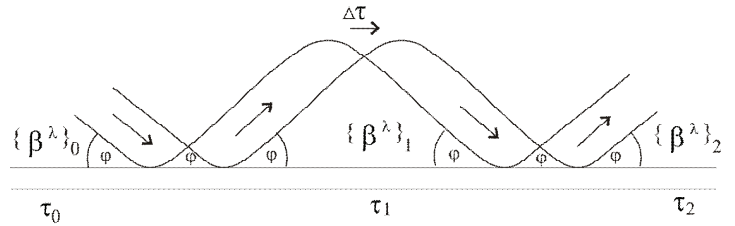
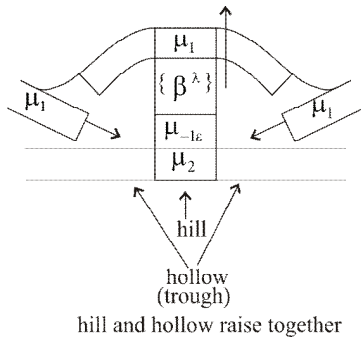


Fig.8. Tide.

1) nature

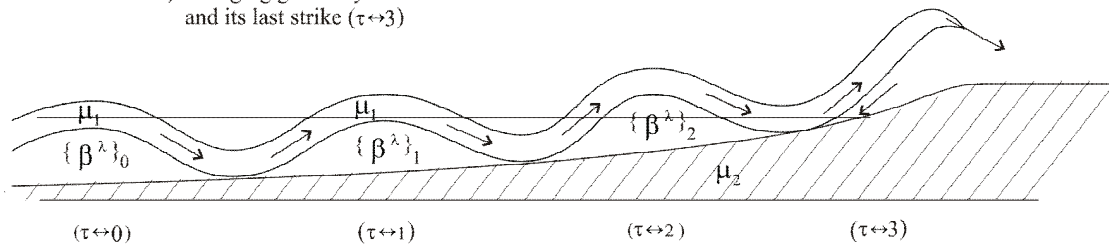


2) mechanism:  ${}^0_{\beta} \rho_{\xi\tau}^\lambda$   
 law:  $\{\beta^\lambda\}_0 \leftrightarrow \{\beta^\lambda\}_\tau, \tau \leftrightarrow 0, \dots, \tau_{con}$



earthly crust acts as mirror of water layers which follow one after another (in frame of one wave) during time  $\Delta\tau$  at that time hill and hollow run together and look as running wave of tide; after that hill&hollow wane in old place and raise in new one (again together) by ruch  ${}^0_{\beta} \rho_{\xi\tau}^\lambda$ .

3) Changing geometry of wave and its last strike ( $\tau \leftrightarrow 3$ )



4) rays of wave

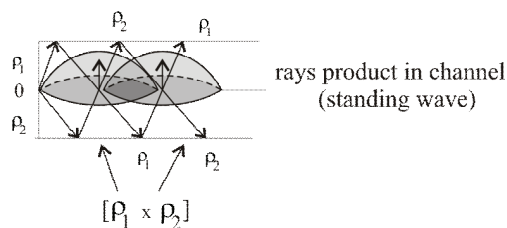
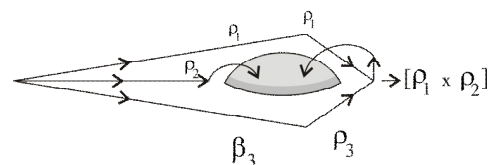
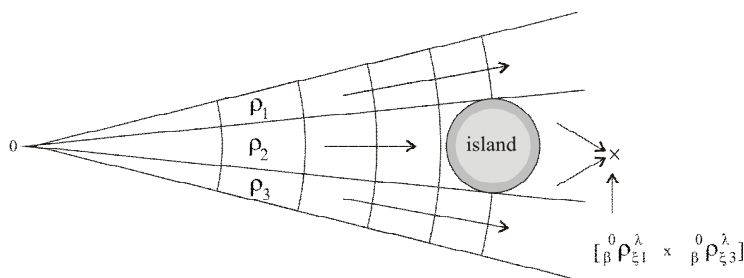
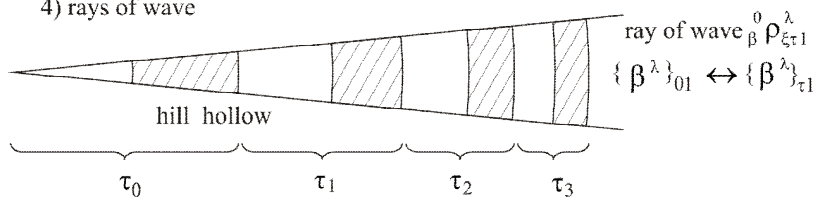


Fig.9 Tsunami and all other striking waves



2. shallow places of seashore (beaches) are bared before tsunami attack since water is drawn in ether zone under hill of wave – in agreement with wave mechanism  ${}^o_{\beta}\rho_{\xi}^{\lambda}$ ;
3. wave behind small island may be higher than one ahead it ( in direction of wave run ) owing to product of wave rays behind island;
4. waves in harbours may be very high owing to products of their rays when seashores act as their mirrors.

Waves images in  $\rho^{\lambda}$  may be applied in design of electric stations and protective constructions of seashores. For instance, certain geometry of seashores in harbours can sway the wave rays and hinder them to raise in their products. And a deep step hollow in bottom near seashores can mirror waves back to sea.

## 6 CONCLUSION

Practical tasks (simulation of chemical nucleus and water waves) are considered above in general lines. However it allows to see wide abilities of hierarchical mechanics of natural systems and fields and to mark its new horizons – mechanics of electro magnetic process in chemical and biological systems, nanotechnologies, temperature changes, technical engines and many other directions of science and practice. Among them in mechanics of  $\beta$ -fields (sound waves thinking processes) which belongs to the highest dimensions of hierarchical systems.

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## AED CONSTRUCTION AND TECHNOLOGY IN DESIGN<sup>1</sup>

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**Abstract:** The paper contains the connected requirements of design systems and the description of knowledge basis (aed) coherent with these requirements. New knowledge basis is hierarchical multilevel system constructed on the idea of twolevel system by M. Mesarovic and Y. Takahara. Unlike twolevel system it connects more than two levels: system own construction and dynamics, its dynamical realization in its environment, and higher levels systems. Aed realization in the processor allows to carry out known and new design and control tasks.

**Keywords:** hierarchical multilevel system, design, control

### 1. THE REQUIREMENTS OF DESIGN SYSTEMS

The knowledge means in design system must

- carry out the main design & control task for the systems of any level under conditions of any initial knowledge uncertainty – to create or to change the system construction & technology, to make its activity in higher level system (environment) the most coordinated with desired environment states on all its levels; (selection stratum);
- change the ways (strategies) of main design and control task carrying out when designed constructions & technologies are multiplied and knowledge uncertainty is removed; (learning stratum);

• change the selection and learning strata as new (more high level) knowledge constructions & technologies are created (self-coordination stratum). Therefore it is necessary to reflect in the knowledge basis both the structure & dynamics of the designed system and its environment in their interactions on the different levels, and the dynamics of the project and knowledge abstract structure.

Besides the knowledge basis must have ability to express the other formal models in its own terms in order to translate the different information in standard form.

The known mathematical models and models of artificial intelligence are incoherent with these requirements because it is impossible to express interlevel relations in their terms.

The best of all for these requirements is twolevel system (Mesarovic et al, 1970). But twolevel system is insufficiently formalized, it has no unit for environment, and its strategies of coordination in different uncertainty are not connected with level increasing process.

That is why twolevel system was altered. New state so differs from former that it has got new name – aed.

Aed is Hellenic word. In given case it means a system for level increasing with unlimited outlook in the level space.

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## 2. KNOWLEDGE BASIS OF DESIGN SYSTEM

All new systems arise from existent units, which are composed in a new way; then these systems alter their elements. By analogy, aed symbol construction  $S^\ell$  was elaborated (with a help of natural languages and graphic means) from dynamical system  $(\bar{\rho}, \bar{\varphi})$  (Mesarovic and Takahara, 1975) numerical positional system  $L^S$ , modern geometry G and computer technology CT ideas union; then it is easy to describe  $(\bar{\rho}, \bar{\varphi})$ ,  $L^S$ , G and CT in aed terms.

$S^\ell$  is expressed by the next formal system:

$$S^\ell \leftrightarrow \{\omega, S_0, \sigma\}^\ell \quad (1)$$

$\omega^\ell$  – aggregated dynamical realization of  $S^\ell$ ,  $\sigma^\ell$  – structure of  $S^\ell$ ,  $S_0^\ell$  – coordinator,  $\ell$  – index of level,  $\ell \in L^S$ .

$$\omega^\ell \leftrightarrow \{\tilde{\omega}, S_0\}^\ell, \sigma^\ell \leftrightarrow \{S_0, \tilde{\sigma}\}^\ell \quad (2)$$

$\tilde{\omega}^\ell$  and  $\tilde{\sigma}^\ell$  are connected by  $S_0^\ell$  and include the aggregated dynamical realizations and structures of object  ${}_o S^\ell$ , its environment  ${}_\varepsilon S^\ell$ , actions  ${}_{o\pi} S^\ell$  of  ${}_o S^\ell$  in  ${}_\varepsilon S^\ell$  and actions  ${}_{\pi\varepsilon} S^\ell$  of  ${}_\varepsilon S^\ell$  with  ${}_o S^\ell$ :

$$\{{}_o S, {}_{o\pi} S\}^\ell \leftrightarrow S^{\ell\pm 0}, \{\pi\varepsilon S, {}_\varepsilon S\}^\ell \leftrightarrow S^{\ell\pm\tau}; \quad (3)$$

that is level  $\ell$  is examined in interlevel relations:

$$\begin{aligned} \tilde{\omega}^\ell &\leftrightarrow \{\{{}_o \omega, {}_{o\pi} \omega\}, {}_{\omega} \gamma, \{\pi\varepsilon \omega, {}_\varepsilon \omega\}\}^\ell \\ &\leftrightarrow \{\{\omega^{\ell\pm 0}, {}_{\omega} \gamma^\ell, \{\omega^{\ell\pm\tau} : \tau \in L^S, \tau \neq 0\}\}\}^\ell \leftrightarrow \quad (4) \\ &\leftrightarrow \{\{\omega^{\ell\pm\tau} : \tau \in L^S\}, {}_{\omega} \gamma^\ell \end{aligned}$$

$$\begin{aligned} \tilde{\sigma}^\ell &\leftrightarrow \{\{\{\omega_i : i \in I\}^{\ell\pm\tau} : \tau \in L^S\}, {}_{\sigma} \gamma^\ell\}^\ell \leftrightarrow \quad (5) \\ &\leftrightarrow \{\{\sigma^{\ell\pm\tau} : \tau \in L^S\}, \omega^{\ell\pm 0}\}^\ell. \end{aligned}$$

$\tilde{\omega}^\ell$  contains the dynamical systems

$${}_k \omega^\ell \leftrightarrow {}_k (\bar{\rho}, \bar{\varphi})^\ell, k \in {}_k L \leftrightarrow \{o, o\pi, \pi\varepsilon, \varepsilon\}, \quad (6)$$

${}_{\omega} \gamma^\ell$  – connections of  $\omega^\ell$  with other systems and  ${}_{\omega} \gamma^\ell$  structure connects the elements of  ${}_k \omega^\ell$  (their states  ${}_k C^\ell$ , inputs  ${}_k X^\ell$  and outputs  ${}_k Y^\ell$ ):

$${}_{\omega} \gamma^\ell \leftrightarrow \{ \{X, C, Y\} : k \in {}_k L \}^\ell. \quad (7)$$

Table 1.

${}_{\omega} \gamma^\ell$	States	Inputs	Outputs
${}_o S^\ell$	${}_o C^\ell$	${}_o X^\ell \leftrightarrow X^{\ell \leftarrow (\ell \pm \tau)}$	${}_o Y^\ell \leftrightarrow {}_o C^\ell$
${}_{o\pi} S^\ell$	${}_{o\pi} C^\ell \leftrightarrow {}_o X^\ell$	${}_{o\pi} X^\ell \leftrightarrow {}_o C^\ell$	${}_{o\pi} Y^\ell \leftrightarrow Y^{\ell \rightarrow (\ell \pm \tau)}$
${}_{\pi\varepsilon} S^\ell$	${}_{\pi\varepsilon} C^\ell \leftrightarrow {}_\varepsilon X^\ell$	${}_{\pi\varepsilon} X^\ell \leftrightarrow {}_\varepsilon C^\ell$	${}_{\pi\varepsilon} Y^\ell \leftrightarrow \{Y^{(\ell \pm \tau) \rightarrow \ell}, Y^{(\ell \pm \tau) \rightarrow (\ell \pm \tau)}\}$
${}_\varepsilon S^\ell$	${}_\varepsilon C^\ell$	${}_\varepsilon X^\ell \leftrightarrow \{X^{(\ell \pm \tau) \leftarrow \ell}, X^{(\ell \pm \tau) \leftarrow (\ell \pm \tau)}\}$	${}_\varepsilon Y^\ell \leftrightarrow {}_\varepsilon C^\ell$

${}_k (\bar{\rho}, \bar{\varphi})^\ell$ :

$${}_k \bar{\rho}^\ell = {}_k \{\rho_t : C_t \times X_t \rightarrow Y_t \ \& \ t \in T\}^\ell \quad (8)$$

$${}_k \bar{\varphi}^\ell = {}_k \{\varphi_{t'} : C_{t'} \times X_{t'} \rightarrow C_{t'} \ \& \ t, t' \in T \ \& \ t' > t\}^\ell$$

The relations of  ${}_k C^\ell$ ,  ${}_k X^\ell$ ,  ${}_k Y^\ell$  are reflected in Table 1.

$S^{\ell\pm\tau}$  ( $\tau \neq 0$ ) has the components, which are not controlled by  $S^{\ell\pm 0}$  immediately,  $S^{\ell\pm 0}$  sets  $Y^{\ell \rightarrow (\ell \pm \tau)}$  and gets  $X^{\ell \leftarrow (\ell \pm \tau)}$  - outputs of level  $\ell$  to the lower  $Y^{\ell \rightarrow (\ell - \tau)}$  and higher  $Y^{\ell \rightarrow (\ell + \tau)}$  levels and inputs from levels  $\ell - \tau$  and  $\ell + \tau$  ( $X^{\ell \leftarrow (\ell - \tau)}$ ,  $X^{\ell \leftarrow (\ell + \tau)}$ ); states  ${}_o C^\ell$  are own inputs and outputs of level  $\ell$ :

$${}_o C^\ell \leftrightarrow \{X^{\ell \rightarrow \ell}, Y^{\ell \rightarrow \ell}\} \quad (9)$$

Thanks to connections in  ${}_{\omega} \gamma^\ell$  it is possible to restore one element of  $\omega^\ell$  after other with corresponding uncertainty.

The coordinator is described by the following way:

$$S_0^\ell \leftrightarrow \{\omega, S_0, \sigma\}_0^\ell, \quad (10)$$

that is  $S_0^\ell$  has own aggregated dynamical realization  $\omega_0^\ell$  and the structure  $\sigma_0^\ell$ ; the availability of  $S_{00}^\ell$  allows to evaluate and to change  $S_0^\ell$  by itself.

Let  $\lambda \leftrightarrow \ell \pm \tau_\lambda$ ,  $\varphi \leftrightarrow \lambda \pm \tau_\varphi$ ,  $\chi \leftrightarrow \varphi \pm \tau_\chi$ ,  $\psi \leftrightarrow \chi \pm \tau_\psi$ ,  $? \leftrightarrow \psi \pm \tau_?$ , etc.,  ${}^\beta L \leftrightarrow \{\lambda, \varphi, \chi, \psi, ?, \dots\}$ . Then  $S_{00}^\ell \leftrightarrow {}^\beta S_0^\ell$  &  $\beta \in L^\beta$ ;  ${}^\beta S_0^\ell$  is contraction of system  $S^\beta$  on the  $S^\ell$ :  ${}^\beta S_0^\ell \leftrightarrow S^\beta / S^\ell$  and

$$\begin{aligned}
{}^\lambda S_0^\ell &\leftrightarrow \{ {}^\lambda \omega, {}^\varphi S_0, {}^\lambda \sigma \}_0^\ell \\
{}^\varphi S_0^\ell &\leftrightarrow \{ {}^\varphi \omega, {}^\chi S_0, {}^\varphi \sigma \}_0^\ell \\
{}^\chi S_0^\ell &\leftrightarrow \{ {}^\chi \omega, {}^\psi S_0, {}^\chi \sigma \}_0^\ell \\
&\dots
\end{aligned} \tag{11}$$

Systems  ${}^\beta S_0^\ell$  are strata of  $S_0^\ell$  and  $\beta$  is outlook in the level space.

The knowledge uncertainty of  $S_0^\ell$  increases with the distance from  $\ell$ . Every level  ${}^\beta \tau$  of uncertainty on every stratum  ${}^\beta S_0^\ell$  has its own coordination strategy. The strategies of  ${}^\lambda S_0^\ell$  (processes  ${}^\lambda S_0^\ell$ ) connect the structure dynamics  $\sigma^{\ell-\tau}$  and  $\sigma^{\ell+\tau}$  with the help of  $\omega^\ell$ .

The replacement of strategies  ${}^\lambda S_0^\ell$  is executed by stratum  ${}^\varphi S_0^\ell$  (the moment it can do it) and it is controlled by following strata. At the same time the outlook in the level space extends from  $\lambda \leftrightarrow \ell \pm \tau_\lambda$  to  $\varphi \leftrightarrow \lambda \pm \tau_\varphi$ .

The given aed definition allows to investigate the activity of systems in the coordination of higher levels, the restoring of systems after the model (or from one element) and the creating of the concrete and abstract systems models, the appearance of new qualities on the new levels and others.

The feedback to its elements allows to determine the former knowledge level means ( $L^s$ ,  $(\bar{\rho}, \bar{\varphi})$ , G and others) in aed symbols.

The representation of geometrical information G in aed terms like numerical information has given new means for carrying out the number of tasks, which are very complicated or irresistible in the traditional theories. Among them

- the synthesis of 3-d objects of any form, which were created independently (these operations demand only the indication of common parts of objects);
- the imitation of biomechanical movements of systems in heterogeneous environment, when the movements are caused by structure deformations;
- the change of topological characteristics of the object as the distance from it changes (when 0-d object transforms in 3-d object and inversely) and others.

For the named and other tasks the aed-processor was worked out. It was implemented as technical and program tools for design and control of concrete physical, chemical, biological, demographical, engineering and knowledge systems (Novikava et al., 1990; Novikava et al., 1991; Novikava et al., 1993).

### 3. CONCLUSION

The adduced brief information gives the idea of aed in general. But it is easy to see the next:

- aed includes the dynamical structure and aggregated models of any designed system and its environment, and allows to carry out the main design task with the help of coordination strategies for the different knowledge uncertainty;
- coordination strategies are the states of design system, their dynamics (like the process of uncertainty removal) reflects the dynamics of design systems;
- the ability of  $S^\ell$  for self-organization with the following alteration of any designed system model and coordination strategies) is ensured thanks to the availability of higher strata of coordinator;
- the basic formal models are represented in aed symbols.

Therefore, aed is coherent with above defined requirements and its own dynamics allows to alter its abstract structure later on.

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## STATE DESIGN: NEW WAY IN EXACT SCIENCES<sup>1</sup>

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Abstract: State design&control task requires to take into account the internal changing constructions of the States on their connected levels (physical, chemical, biological, demographical, engineering and knowledge) and States interactions on all known levels. The using of aed theory (new means of mathematics and cybernetics) allows to construct the key statute coherent with State design requirements. The key statute considered in the paper is at the same time the description of knowledge networks of States and States unions. These networks maintained by the means of new mathematics (which allow to change the units and actions when the actions are carried out) discover the way to State design turning into exact science direction.

Key words: State design&control, hierarchical knowledge networks

### 1. STATE DESIGN TASK AND THE MAIN CHARACTERISTICS OF AED THEORY

New States with their new statutes arise now thanks to several countries division and the main Laws

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reconstruction in many other countries. The statutes are States symbols and statutes elaboration is State design process. When these symbols are exact images of real systems, strongly connected with their history and current constructions, they allow to create well settled States with the forestalling of their controlled internal and external dynamics both from within and in the World. Otherwise the process of State creation and control becomes uncertain.

Knowledge uncertainty in State creation and control in many cases leads to unforeseen and dangerous results. But this scarcity will remain until high uncertainty characterizes State design process. For lack of general State symbol good for design & control tasks the main design strategy is now the strategy of known States multiplying. In this way the Laws of known States are realized as the means for new States settlement. It is habitual design strategy, but it may be justified for the countries with the like history and current state, if bear in mind that statutes which are the examples constantly demand the amendments in their countries, moreover in new States. Alien languages and Laws, connected with real systems only in their States-sources, either are rejected by real systems of other States or are established for a long time with unwise destruction of their own reasons and the whole World diversity. The trials to connect odd details of several concrete statutes in State design at times give chimerical documents entirely unfit in practice. The interactions of arising States with each other and with stable countries are not controlled under that conditions and the danger for the whole World well-being increases.

The way of sensible creation and changing of States and their unions is the only one: the elaboration of general State symbol realization which must have identical understanding in all languages and take into account all diversity of States constructions&dynamics. (It means that general statute must be described by mathematical and cybernetical theories. Such description is obligatory for general statute use as basis in knowledge networks elaboration for States and States unions.) Then concrete State design will be executed as general statute concretization with predicted results.

Natural history allows to see physical, chemical and biological levels in the World level space. These levels maintain demographical level and with its units create and maintain an engineering level (industry, service, transport, trade and currency). Existent States have all signs of lower levels: natural (physical, chemical, biological), demographical and engineering. They are coordinated by knowledge level which is the highest current level created by lower levels history; it contains language, art, learning, science&design. Coordinating (design & control) process is realized with the help of the government (State power institutes). In this way the general (key) statute for any State coordinating must settle

State construction&dynamics on all its own levels: natural, demographical, engineering and knowledge;

State coordination unit (constructions, activity, interactions and changing way of legislative and executive power, justice system);

State external activity as the unit in the World (its connections with other States on all their levels);

way of design & control of own statute dynamics (statute correction and its defence against internal and external illegal actions).

In this way the State design & control task requires the elaboration of exact symbol construction which unites State dynamical realization as a single unit, dynamical realizations of its construction details on all known levels with their interactions, and dynamical constructions of higher levels systems.

The best of all for the aim named above is twolevel system (Mesarovic, 1970). It contains for any system its own construction (its units with their interactions controlled by the coordinator) and its input-output description as the unit in higher level system. Thanks to that twolevel system allows to investigate the process of systems uniting from the strategy with knowledge uncertainty to the one with high knowledge of the coordinator. At the same time the process of system dividing (or system multiplying

when several systems with identical level characteristics arise from one source) is not considered in twolevel system as well as the connections of constructions & dynamics of higher and lower levels (the coordinator of twolevel system cannot see and change the constructions of lower levels units).

For the named aim achievement twolevel system was changed. Its new state (Новікава and Мятлюк, 1990) was described by general systems theory (Mesarovich and Takahara, 1975), number and geometry codes. New symbol system (with its own mathematical and graphical language) has got own name - aed. Then basic mathematical and cybernetical systems in aed symbols were defined (Novikava S. and K. Miatliuk, 1990; Novikava S. and S. Gancharova, 1990; Novikava, et al., 1990) as well as several concrete physical, chemical, biological, demographical, engineering, and knowledge systems with the realization of design&control tasks in aed-processor (Novikava, et al., 1991; Novikava, et al., 1993).

Unlike twolevel system and other means of set theory based mathematics and cybernetics the outlook in the level space of aed is unlimited and higher levels can see and change the lower levels constructions and activity owing to their settlement by new levels laws. Thereby aed theory as the higher level unit contains set theory constructions and laws, but inverse statement is incorrect.

Aed is symbol realization of the whole hierarchical multilevel space and it defines the space laws. The main law of hierarchical space (the law of level increasing) is defined by the following statement: all units arise in lower levels multiplying and uniting, create more high levels units and are changed by higher levels. The law of level increasing considers two connected actions: uniting and multiplying (known mathematical actions are contained in them). They always lead to level increasing and their general records have concrete signs for concrete levels (physical, chemical et al.). In uniting action the unit of higher level is created and the units of all lower levels are stratificated (selected) in agreement with their contributions in its creation. Higher level unit has wide and symbolized realizations, and its power (coordinator) has direct contacts with all lower levels by its strata. Under certain conditions the unit of every level is able to create several units of its own level by dividing (multiplying) action.

## 2. HIERARCHICAL SPACE HISTORY

Hierarchical space created by its history contains now physical, chemical, biological, demographical,

engineering and knowledge levels. The States are the knowledge level units and State design&control task requires to understand and to describe all known levels and their connections.

In line with hierarchical world understanding in known time at first the physical units were created and united in their leading (higher level) units. The leading (key) units in physical space are the stars and stars unions. The stars unite the ordinary physical units (the most significant among them are the hydrogen nuclei, they belong also to the chemistry time beginning), change them and lay out the changed units along the star layers (strata) - from hydrogen to heavy nuclei. Every chemical nucleus is the symbol image of the certain star layer - symbol realization of star history till this layer arising, and at the same time it is the symbol of future (chemical) strategy (chemical activity in the reactions). This activity in the stars is defined only as outlook in the level space (as arising time signs). Star construction is created by astrophysical technology, then - by astrochemical one which unites the diverse states of astrophysical actions and changes them. Astrochemical technology leads the certain stars to the explosions: they are divided (multiplied) as initial units of chemical time.

Star dividing leads to its uniting history restoring in new - astrogeochemical - technology. This restoring creates several units of chemical time - large scale chemical reactions which contain all symbols of star layers and connect them owing to chemical activity realization as new power. The diverse states of chemical reactions (gas, liquid, solid) are the layers of geochemical construction and these layers are connected by biochemical units - leading units of chemistry time and initial states of biology level.

Biochemical units (later - cells) have the signs of all chemical reactions states, unite and control them. They are multiplied as level initial state by biological technology and their uniting leads to the arising of multicell units (the symbols of cell space with all its layers). Biological units change all physical and chemical processes in their constructions; multicell units connect diverse cell states and change them: the cells in their constructions are like the multicell units and single cells are able to restore the whole multicell unit - the leading state of biology level and the initial one in demographical time.

Multicell units multiplying and uniting acts in demographical space create the constructions connected by engineering interactions. They unite and change all before created times in their technologies. These units are leading instances in demographic level and the initial state in engineering one.

The units of engineering time connect and change all lower times symbols. Demographic unions in engineering constructions are able to coherent actions with before stated aims thanks to the creation of exact symbol images of concrete world strata with their future states. Multiplied by their own technology engineering units are connected by the knowledge means (language, art and others). The key engineering units (which connect the diverse engineering technologies) create their statutes - at first in the works of art. The statutes define their world outlook: their history, current laws of their constructions, the laws of interactions with their environment and future strategies. The statutes arising is the beginning of knowledge time. The leading engineering units are the initial states in knowledge space.

The initial units of knowledge time - the States - create the State power institutes, which maintain their statutes: legislative, executive and justice power. They have all lower strata (nature, demographic and engineering layers) and the strata of outlook in the level space: learning, science, art, design. Now the States multiply and unite with new time creation.

### 3. GRAPHIC-NUMBER IMAGES OF AED STATUTE

Knowledge level construction (current level space) is imaged on Fig.1.

It contains the fundamental and applied sciences for all known levels; applied institutes carry out design&control tasks. They are united by the main knowledge means (sound and graphic languages, mathematics and cybernetics technologies) which are the strata of knowledge level power: they have direct contacts with all concrete science directions. Aed theory and aed processors networks describe and connect the knowledge power strata. All units on fig.1 have their realizations ( $r$ ) in other levels. These realizations are revealed by the certain settlement ( $s$ ) in the constructions of other levels. The actions of higher levels creating are imaged by the arrows. Their initial stages belong to the art in knowledge uncertainty, then art technologies acquire the signs of scientific maintained design. Art technologies are the most significant in the uniting action when the leading unit is created in knowledge uncertainty; design with scientific maintenance is counted rather on the multiplying (learning) act than on the uniting one. The concrete directions of design&science on fig.1 are the strata of knowledge direct contacts with real units and technologies of lower levels - nature (physical, chemical, biological), demographical and engineering. All these contacts belong to one strata line (they are in one time), that is the new laws of

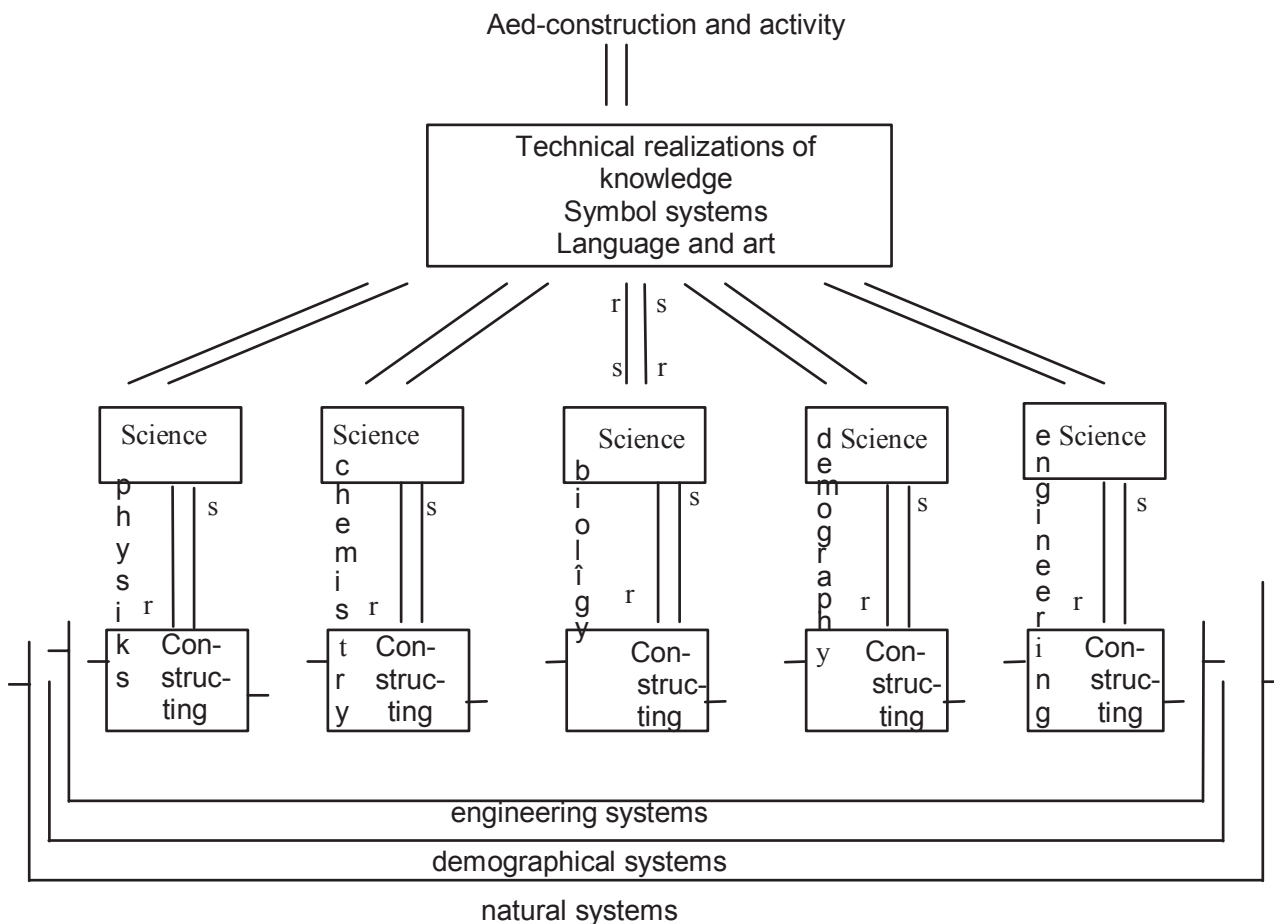


Fig.1. Symbol construction of knowledge level; (r) - realization, (s) - settlement.

knowledge level are defined in all known levels uniting and learning.

Nearer to aed understanding of level space history, current state and future strategy is Fig.2. All times (levels) on Fig.2 are described by their constructions strata with taking into account their power institutes and their outlook in the level space. Every level history may be accounted by the consideration of current highest (knowledge) level. Now it is the construction which connects diverse knowledge units. They are imaged as two units (to the right and to the left from the arising time image). The whole construction of knowledge level contains all other times (they are bounded by inclined lines) and it is contained in them - its image intersects all time images of level space (engineering, demographic and nature): knowledge is the power of all lower strata and has direct contacts with them. The knowledge units (States) are connected by the arising time unit. This single unit is their outlook in the level space, the strategy for the future. The unit of arising time is described by the chimeric image (only by the signs of its own construction) while the units of lower times are described also by their interactions with the units of their time, by higher laws and by the highest (aed)

statute (the aed graphic image which is realized by the constructions of Fig.1,2).

Higher times images change the images of lower times: when the new leading unit arises its image intersects all lower units on Fig.2 and new strata (layers) arise in their constructions. These strata are their new power institutes which lay out all units of lower constructions in new layers: the more investments of the units in their power creating the near their graphic images to the image of the most active strata (to outlook in the level space). Fig.2 gives the convenient way of concrete units defining by the changeable measure (graphic dimension coherent with number measure) of their concrete strata.

The investigations of strata dimensions in diverse units give a chance to see the connection of measure of the whole unit (its signs in higher laws space) with the measure of its construction (its strata dimensions).



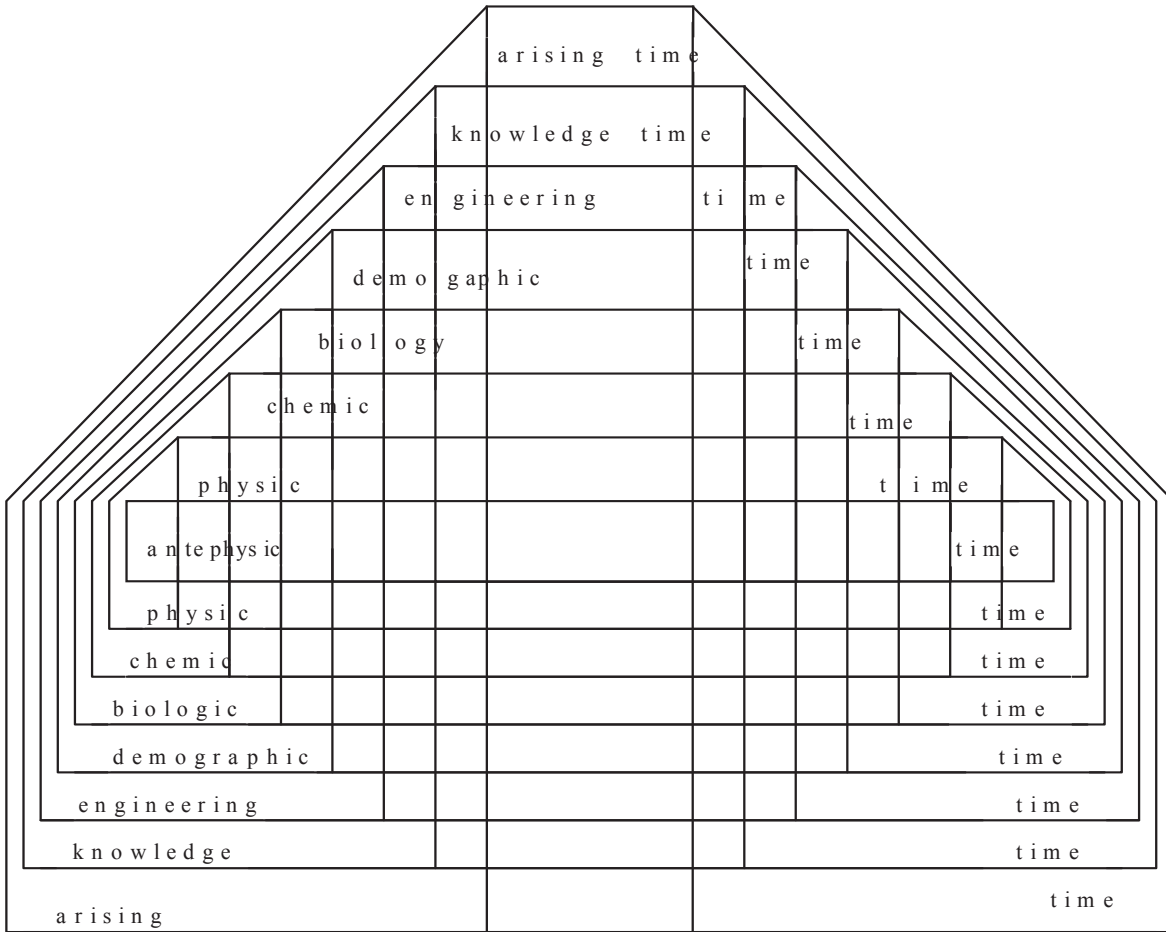


Fig.2. Aed statute in graphic number code: the image of hierarchic time and space.

The images of diverse times arise in the outlook in the level space as single units with chimeric statutes: their laws are described only by their own constructions. Now the arising time unit is in this state. It is the field of interactions of several knowledge units (they are imaged as two units: to the right and to the left of arising time). The arising unit has direct contacts with all lower times (level space strata): its image intersects them and contains them in its power field bounded by the inclined lines. The interactions of lower units are carried out by all strata under design&control of their higher levels (their power strata). The number of power strata of all units is measured by the number of vertical lines in their constructions (by the distances of their times of power from the current power); the number of their lower strata is measured by the number of horizontal lines (by the distances of their times of power from (known) initial time power).

Exact actions of aed mathematics realized by new cybernetics means (aed processors and their networks) allow to design the lower constructions coherent with the higher times statutes. Fig.2 as the graphic symbol of aed statute is the graphic image of aed processor and aed network.

#### 4. THE KEY STATUTE FOR STATES AND STATES UNIONS DESIGN&CONTROL

strata of aed statute on Fig.2. It allows to see all signs required in State design&control task: State history (described by lower strata of its construction and by higher laws realization in them), State current signs and the strategy of its future activity. This statute connects:

The known times units (their concrete statutes) may be described by aed statute. For instance the concrete own statute of any State may be imaged by the defining of concrete dimensions in the key statute of States and States unions on Fig.3. This statute is constructed by the defining of concrete

the State construction on all known strata (nature, demographic, engineering and knowledge) with taking into account the settlement of lower units by higher strata signs; every layer has direct contacts with all other strata; thanks to these connections it is able to design&control all lower and higher constructions and at the same time it is changed by

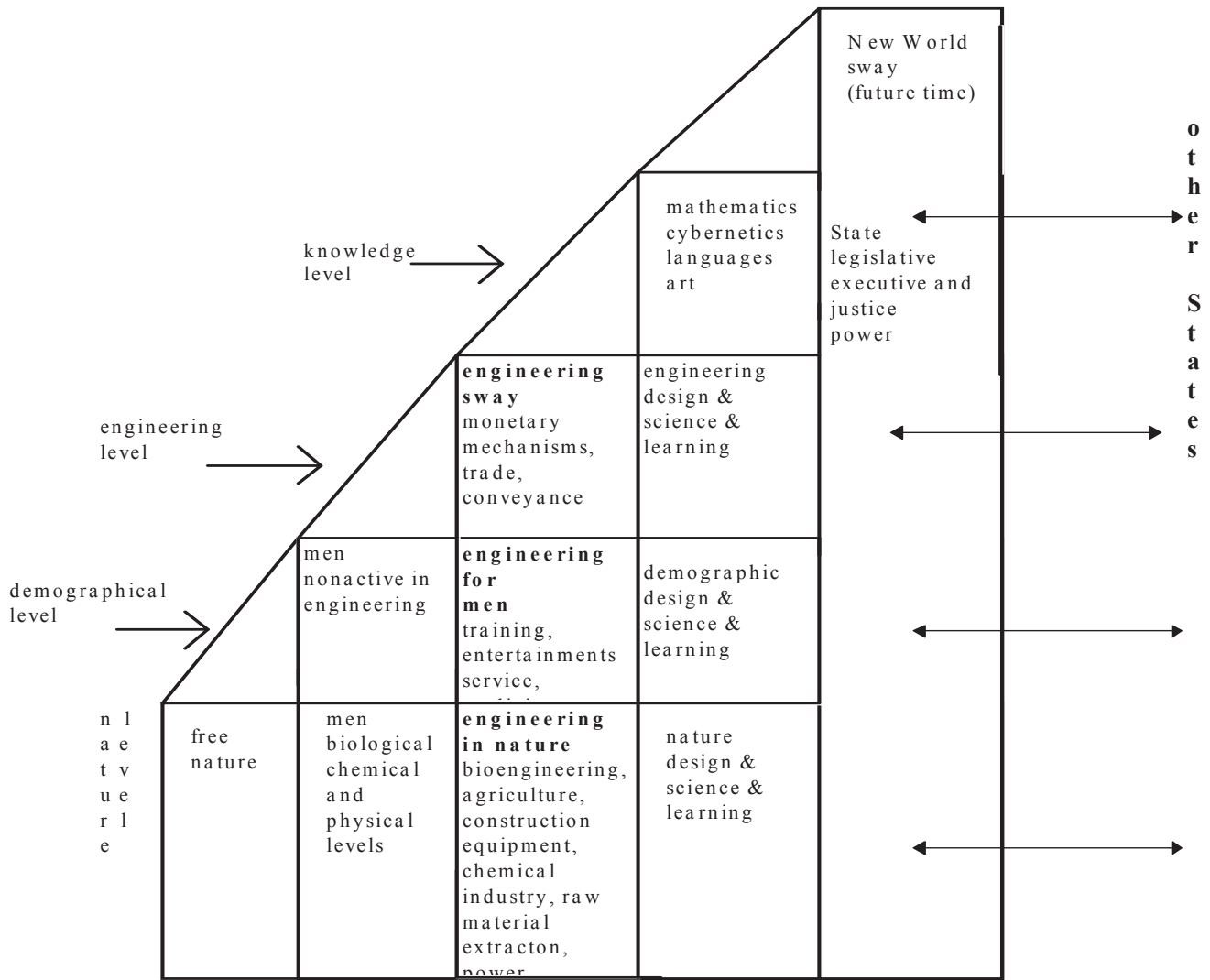


Fig.3. The key State statute (aed network in State design&control).

lower and higher activity; however the connection with higher times is stronger than the one with all lower statutes: all lower laws are changed by higher times; nature strata is divided in free and new layers; demographic layers create the units of engineering and knowledge times and are changed by them - new layers are created in demographic field by new times as

well as new engineering strata are defined by knowledge units; higher strata (mathematics and cybernetics) connect State construction with arising time; they are the most considerable means of higher laws executing in lower levels since they are the base of existent knowledge networks: the changing of mathematics and cybernetics by new knowledge will be realized in all knowledge networks;

the State power institutes (constructions, activity and interactions of State legislative, executive and justice power); these institutes have concrete realizations for all lower layers of the State; the will

and the states of lower levels are strongly connected with the will and the states of all State power institutes; these institutes are also connected with arising power;

the State external connections as the unit in the World (its interactions with other States); the interactions with other States are realized by all State strata: the States exchange the nature, demographic, engineering and knowledge units; this exchange must be controlled by State power and at the same time it is the reason of interState laws arising; these laws are united in the World statute - the new World power; the arising World statute (designed in the States uniting action) will be multiplied in all statutes; (the interactions of State diverse strata are marked on fig.3 by the arrows which are under control of the State and World power institutes);

the way of design&control of the State statute (statute correction and its defence against internal and external illegal actions); this way is defined in

the statute image as the technology of joint will of all State strata realization and as the strategy of statute design&control by arising power of knowledge time; the strategy of new power is the elaboration of new knowledge means, the most coherent with the aim of the level increasing of all diverse States ( with taking into account their world outlooks and without their diversity destroying).

The State statute considered above is free from the restrictions of concrete States regimes. All States regimes from monarchic to democratic and now unknown orders may be described by the key statute. Its considered image belongs to exact science and owing to that it is realized by the means of all known strata. Its realization in diverse languages will change them by new knowledge, but it will not destroy these languages as well as the diversity of all States on all their strata.

The most significant knowledge of key statute described above is the main law of hierarchic space: all units arise in lower levels multiplying and uniting, create more high levels units and are changed by higher levels. The main law (it may be described only by aed mathematics means which allow to change the units and actions of lower levels by higher levels activity) is coherent with many statutes of known States: these statutes contain the Laws of their changing in agreement with the will of lower (certain) strata of their States and with the Laws of States interactions signed by their States.

However till now the clear realization of level space construction and its changing is away in all statutes of States and States unions which are now in force in the World. Among them the United Nations Statute which defines the Laws of demographical and engineering levels, but does not contain connected laws for all World strata described in key statute (Nevertheless the U. N. move in the direction of the key statute: the significance of the UNESCO activity in the highest (knowledge) level and the activity in the defence of the nature diversity is increased.) When the rights of diverse strata and their connections are almost ignored in the main States Laws it leads to illegal activity in these strata and to heavy disasters, which arise in the strata ignored by Laws, spread along the whole strata space and destroy all other strata not only in their States, but also in other countries. The using of new statute as the key to the whole Laws space undestanding and defining may be the stage in the way to scientific

maintained design&control of States and States unions.

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# AED THEORY AND ITS REALIZATIONS BY HIERARCHICAL KNOWLEDGE NETWORKS<sup>1</sup>

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Abstract: Aed theory and hierarchical networks of aed processors are considered in the paper. Unlike the means of mathematics and cybernetics based on set theory the new knowledge means are coherent with design&control tasks requirements. They allow to realize the main law of hierarchical level space: all units arise in lower levels multiplying and uniting, create more high levels units and are changed by higher levels. It is the law of new mathematics with units and actions which are changed when higher units and actions arise in lower actions carrying out. Aed processors networks created in agreement with this law (as well as the units and processes of all known levels: physical, chemical, biological, demographical, engineering and knowledge) are able to connect the diverse levels and to design their new states with taking into account their own changing constructions and activity and their interactions.

Keywords: hierarchical knowledge networks, design, control

## 1. THE REASONS OF AED THEORY ARISING

Aed theory arising reasons are design&control process requirements. The knowledge means in this process must carry out the main design&control task for the units of any levels in any knowledge uncertainty:

- to create and to change the unit construction & technology by the way of lower levels units selection and their interactions settling, to make its state and activity in higher levels the most near to their aims (uniting&selecting stratum);

- to change the ways (strategies) of design&control when designed unit is multiplied and knowledge uncertainty is removed (multiplying & learning stratum);

- to change all strata as new (more high level) knowledge is created (uniting&multiplying strata of knowledge base).

Knowledge base of design process in agreement with these requirements must be the unit with hierarchical construction which connects any level unit, its lower and higher levels. Uncertain higher levels must be described in it by creating strategy and higher levels arising must change all lower levels.

Mathematics and cybernetics theories based on set theory are incoherent with design requirements since set theory describes onelevel world outlook. In line with it the connections in systems constructions are more strong than systems connections with their holding constructions, the laws of levels weaken with level increasing, and only one (initial) level is always leading in the level space.

General image of all onelevel theories of mathematics and cybernetics on Fig.1 allow to see the boundaries of widespread understanding of abstract system and the boundaries of knowledge networks based on this understanding. The systems are defined on Fig.1 by the rectangles, their connections – by certain numbers of arrows; the

measures of systems internal connections outnumber the measures of connections in their holding systems as well as in widespread understanding. As the result the details look as indivisible atoms in holding systems and the last holding system is the set –

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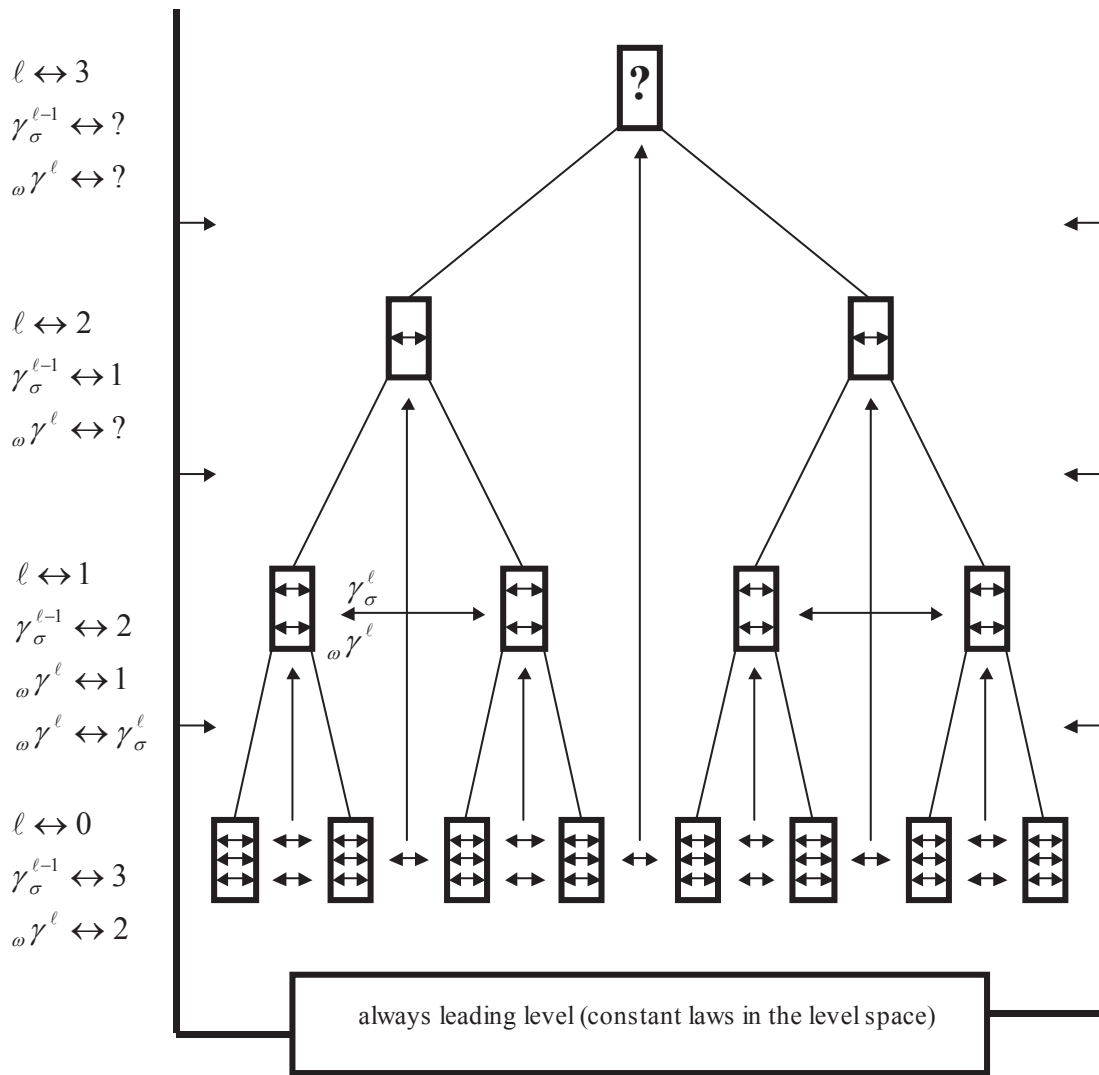


Fig.1. Exact (graphic-number) image of onelevel world outlook kinds. They are based on the understanding of system as the construction which connects its own details stronger than its connections with other systems in its environment.  $\omega^{\ell}$  - system of level  $\ell$ ,  $\sigma^{\ell-1}$  - its construction,  $\omega \gamma^{\ell}$  - its connections in its holding system, which has the construction  $\sigma^{\ell}$  with the connections  $\gamma_{\sigma}^{\ell}$ ;  $\omega^{\ell}$  are defined by the rectangles,  $\gamma^{\ell}$  - by the arrows and arrows number is the measure of connection. These measure decreases with level increasing and higher systems cannot control the constructions and activity of lower systems. The construction of the last holding system cannot be described by system axioms, it means that the constant laws (axioms) of system are incomplete or contradictory.

chaotic construction with untied actions of its atoms, which does not control the atoms activity, not to mention their constructions changing.

The using of this system understanding in knowledge networks creation restricts their abilities. The existent knowledge networks are limited in design tasks carrying out when lower levels units and actions must be changed by higher levels (created in their interactions).

The best of all for design aim in current cybernetics is twolevel system (Mesarovic, et al., 1970). However it is defined as symbol realization of onelevel world outlook: its coordinator cannot see the internal constructions and activity of lower levels systems, their laws are stronger than the laws of their

interactions in higher levels. That's why twolevel system was extended to the whole level space and its new state has got its own name - aed (Aed is Hellenic word and it means the changing symbol unit with unlimited outlook in the level space.) At first aed realization was chimerical, described by diverse knowledge means: dynamical systems (Mesarovic and Takahara, 1975), geometry and number code. Then all named and other knowledge means were described by initial realization as aed connected states (Novikava, et al., 1990). Now aed theory has own language with new graphics and more fine settlement of the knowledge space.

## 2. AED STATUTE IN MATHEMATICS SYMBOLS

Aed theory describes new world outlook coherent with main law of level space dynamics: all levels arise in lower levels multiplying and uniting, create more high levels and are settled by higher levels realizations. In agreement with level increasing law the leading laws are the laws of the highest current levels and they change all levels created before. The main law may be changed by new (arising) levels. This theory is beyond set theory boundaries, but it remains in mathematics as exact science.

Now the level space contains physics, chemistry, biology, demography, engineering and knowledge levels (Novikava, et al., 1991; Novikava, et al., 1993). They were created by the uniting and multiplying strategy and current highest level is knowledge. It contains language, art, learning, design&science. Its activity changes engineering level (industry, service, trade, currency), gives new stratification of demography units (creative work belongs to the most considerable strata), reconstructs all known levels and maintains new levels arising.

The statute considered below unites the codes of twolevel system and general systems theory by (Mesarovic, et al., 1970; Mesarovic and Takahara, 1975), number code  $L^S$  (Lebeg, 1938), geometry (G) and cybernetics technologies (CT) methods; dynamical systems  $(\bar{\rho}, \bar{\varphi})$  are the main means of the description of the named codes. Then (in multiplying action) they are described by aed means. The details of aed statute  $S^\ell$  are the connected laws of aed strata: level (time), unit, construction, act (process), statute (laws, connections), power (coordinator) and outlook in the level space (design field). They are united by the main law of hierarchic space (the constructions of lower levels create the units of higher times and this units multiply with new level constructions arising).

$S^\ell$  is described by following symbol construction:

$$S^\ell \leftrightarrow \{\omega, S_0, \sigma\}^\ell$$

$\omega^\ell$  – aggregated dynamical realization of the units and acts,  $\sigma^\ell$  – construction,  $S_0^\ell$  – coordinator,  $\ell$  – index of level,  $\ell \in L^S$ .

$$\omega^\ell \leftrightarrow \{\tilde{\omega}, S_0\}^\ell, \sigma^\ell \leftrightarrow \{S_0, \tilde{\sigma}\}^\ell$$

$\tilde{\omega}^\ell$  and  $\tilde{\sigma}^\ell$  are connected by  $S_0^\ell$  and contain the dynamical realizations and constructions of unit (object)  ${}_o S^\ell$ , its environment  ${}_\varepsilon S^\ell$  (other units of its level), acts (processes)  ${}_{o\pi} S^\ell$  of  ${}_o S^\ell$  in  ${}_\varepsilon S^\ell$  and acts  ${}_{\pi\varepsilon} S^\ell$  of  ${}_\varepsilon S^\ell$  with  ${}_o S^\ell$ :

$$\{{}_o S, {}_{o\pi} S\}^\ell \leftrightarrow S^{\ell\pm 0}, \{{}_{\pi\varepsilon} S, {}_\varepsilon S\}^\ell \leftrightarrow S^{\ell\pm\tau};$$

that is level  $\ell$  is discovered in the interlevel connections:

$$\begin{aligned} \tilde{\omega}^\ell &\leftrightarrow \{\{{}_o \omega, {}_{o\pi} \omega\}, {}_\omega \gamma, \{{}_{\pi\varepsilon} \omega, {}_\varepsilon \omega\}\}^\ell \\ &\leftrightarrow \{\{\omega^{\ell\pm 0}, {}_\omega \gamma^\ell, \{\omega^{\ell\pm\tau} : \tau \in L^S, \tau \neq 0\}\}\}^\ell \\ &\leftrightarrow \{\{\omega^{\ell\pm\tau} : \tau \in L^S\}, {}_\omega \gamma^\ell\}^\ell \end{aligned}$$

$$\begin{aligned} \tilde{\sigma}^\ell &\leftrightarrow \{\{\{\omega_i : i \in I\}^{\ell\pm\tau} : \tau \in L^S\}, {}_\sigma \gamma^\ell\}^\ell \leftrightarrow \\ &\leftrightarrow \{\{\sigma^{\ell\pm\tau} : \tau \in L^S\}, \omega^{\ell\pm 0}\}^\ell. \end{aligned}$$

$\tilde{\omega}^\ell$  contains the dynamical systems

$${}_k \omega^\ell \leftrightarrow {}_k (\bar{\rho}, \bar{\varphi})^\ell, k \in {}_k L \leftrightarrow \{o, o\pi, \pi\varepsilon, \varepsilon\},$$

${}_\omega \gamma^\ell$  – connections of  $\omega^\ell$  with other units and acts, and the construction of  ${}_\omega \gamma^\ell$  connects the details of  ${}_k \omega^\ell$  (their states  ${}_k C^\ell$ , inputs  ${}_k X^\ell$  and outputs  ${}_k Y^\ell$ ):

$${}_\omega \gamma^\ell \leftrightarrow \{{}_k \{X, C, Y\} : k \in {}_k L\}^\ell.$$

${}_k (\bar{\rho}, \bar{\varphi})^\ell$ :

$$\begin{aligned} {}_k \bar{\rho}^\ell &= {}_k \{\rho_t : C_t \times X_t \rightarrow Y_t \& t \in T\}^\ell \\ {}_k \bar{\varphi}^\ell &= {}_k \{\varphi_{t'} : C_t \times X_{t'} \rightarrow C_t \& t, t' \in T \& t' > t\}^\ell \end{aligned}$$

The network of connections of  ${}_k C^\ell$ ,  ${}_k X^\ell$ ,  ${}_k Y^\ell$  is described by Table 1.

$S^{\ell\pm\tau}$  ( $\tau \neq 0$ ) has details, which have increasing uncertainty in the signs of  $S^{\ell\pm 0}$ ;  $S^{\ell\pm 0}$  sets  $Y^{\ell \rightarrow (\ell\pm\tau)}$  and gets  $X^{\ell \leftarrow (\ell\pm\tau)}$  – outputs of level  $\ell$  to the lower  $Y^{\ell \rightarrow (\ell-\tau)}$  and higher  $Y^{\ell \rightarrow (\ell+\tau)}$  levels and inputs from levels  $\ell-\tau$  and  $\ell+\tau$  ( $X^{\ell \leftarrow (\ell-\tau)}$ ,  $X^{\ell \leftarrow (\ell+\tau)}$ ); states  ${}_o C^\ell$  are own inputs and outputs of level  $\ell$ :

$${}_o C^\ell \leftrightarrow \{X^{\ell \rightarrow \ell}, Y^{\ell \rightarrow \ell}\}$$

Thanks to the connections in  ${}_\omega \gamma^\ell$  any detail of  $\omega^\ell$  is restored by its other details with becoming uncertainty.

Table 1.

${}_o\mathcal{Y}^\ell$	States	Inputs	Outputs
${}_oS^\ell$	${}_oC^\ell$	${}_oX^\ell \leftrightarrow X^{\ell \leftarrow (\ell \pm \tau)}$	${}_oY^\ell \leftrightarrow {}_oC^\ell$
${}_{o\pi}S^\ell$	${}_{o\pi}C^\ell \leftrightarrow {}_oX^\ell$	${}_{o\pi}X^\ell \leftrightarrow {}_oC^\ell$	${}_{o\pi}Y^\ell \leftrightarrow Y^{\ell \rightarrow (\ell \pm \tau)}$
${}_{\pi\varepsilon}S^\ell$	${}_{\pi\varepsilon}C^\ell \leftrightarrow {}_\varepsilon X^\ell$	${}_{\pi\varepsilon}X^\ell \leftrightarrow {}_\varepsilon C^\ell$	${}_{\pi\varepsilon}Y^\ell \leftrightarrow \{Y^{(\ell \pm \tau) \rightarrow \ell}, Y^{(\ell \pm \tau) \rightarrow (\ell \pm \tau)}\}$
${}_\varepsilon S^\ell$	${}_\varepsilon C^\ell$	${}_\varepsilon X^\ell \leftrightarrow \{X^{\ell \leftarrow (\ell \pm \tau)}, X^{(\ell \pm \tau) \leftarrow (\ell \pm \tau)}\}$	${}_\varepsilon Y^\ell \leftrightarrow {}_\varepsilon C^\ell$

The coordinator is described by the following way:

$$S_0^\ell \leftrightarrow \{\omega, S_0, \sigma\}_0^\ell,$$

that is  $S_0^\ell$  has own aggregated dynamical realization  $\omega_0^\ell$  and the construction  $\sigma_0^\ell$ ; the availability of  $S_{00}^\ell$  (the connection with higher levels) allows to account and to change  $S_0^\ell$  by its own activity.

Let  $\lambda \leftrightarrow \ell \pm \tau_\lambda, \varphi \leftrightarrow \lambda \pm \tau_\varphi, \chi \leftrightarrow \varphi \pm \tau_\chi, \psi \leftrightarrow \chi \pm \tau_\psi, ? \leftrightarrow \psi \pm \tau_?, \dots$ ,  ${}^\beta L \leftrightarrow \{\lambda, \varphi, \chi, \psi, ?, \dots\}$ . Then  $S_{00}^\ell \leftrightarrow {}^\beta S_0^\ell$  &  $\beta \in L^\beta$ ;  ${}^\beta S_0^\ell$  is the contraction of field  $S^\beta$  on the  $S^{\ell, \beta} S_0^\ell \leftrightarrow S^\beta / S^\ell$  and

$$\begin{aligned} {}^\lambda S_0^\ell &\leftrightarrow \{\lambda \omega, {}^\lambda S_0, {}^\lambda \sigma\}_0^\ell \\ {}^\varphi S_0^\ell &\leftrightarrow \{\varphi \omega, {}^\varphi S_0, {}^\varphi \sigma\}_0^\ell \\ {}^\chi S_0^\ell &\leftrightarrow \{\chi \omega, {}^\chi S_0, {}^\chi \sigma\}_0^\ell \end{aligned}$$

...

The fields  ${}^\beta S_0^\ell$  are strata of  $S_0^\ell$  and  $\beta$  is outlook in the level space. The knowledge uncertainty of  $S_0^\ell$  is increased with the distance from  $\ell$ . Every level  ${}_{\beta\tau}$  of uncertainty on every stratum  ${}^\beta S_0^\ell$  has its own coordinating strategy. The strategies of  ${}^\lambda S_0^\ell$  (processes  ${}_{o\pi}{}^\lambda S_0^\ell$ ) connect the changes of constructions  $\sigma^{\ell-\tau}$  and  $\sigma^{\ell+\tau}$  with the using of  $\omega^\ell$ . The action of key unit  $\omega^\ell$  creation in  $\sigma^{\ell-\tau}$  is uniting process, the action of  $\sigma^{\ell+\tau}$  creation when  $\ell$  is the highest level is the multiplying process with the initial unit  $\omega^\ell$ .

The changing of strategies  ${}_{o\pi}{}^\lambda S_0^\ell$  as far as one can is executed by stratum  ${}^\varphi S_0^\ell$  and it is controlled by following strata. At the same time the outlook in the

level space extends from  $\lambda \leftrightarrow \ell \pm \tau_\lambda$  to  $\varphi \leftrightarrow \lambda \pm \tau_\varphi$  and so on.

Uncertainty removal in  $S_0^\ell$  outlook is equivalent of system organization increasing (increasing of interactions level), when  ${}^\lambda S_0^\ell$  realizations are united and multiplied by  ${}^\beta S^\ell$  ( $\beta > \lambda$ ), which realize the level increasing process in hierarchic space  $S^\ell$ .

In agreement with the run of events in time increasing process the uniting stage (aed chimeric statute creation in known mathematics and cybernetics means) becomes the multiplying act which realizes the defining of known means ( $L^S, (\bar{\rho}, \bar{\varphi}), G, CT$  and other) by aed technology.

### 3. THE MAIN KNOWLEDGE CONSTRUCTIONS IN AED THEORY

The dynamical systems are described by aed terms in (Novikava and Gancharova, 1990). This result is almost obvious. Since  $(\bar{\rho}, \bar{\varphi})$  is generalization of all existent formal models (Mesarovich and Takahara, 1975), the mathematics and artificial intelligence means become coordinated details of general knowledge construction. Besides they acquire wider abilities for habitual and new tasks carrying out.

The description of  $L^S$  is made by the following way.

Existent number code of  $L^S$  has not all signs of  $S^\ell$ : the lower units constructions and activity are not changed by higher levels. In aed theory it acquires these signs. The most considerable states of number code (from integer to hypercomplex numbers) are described by the standard unit  $L^{S^\ell}$ , which is founded

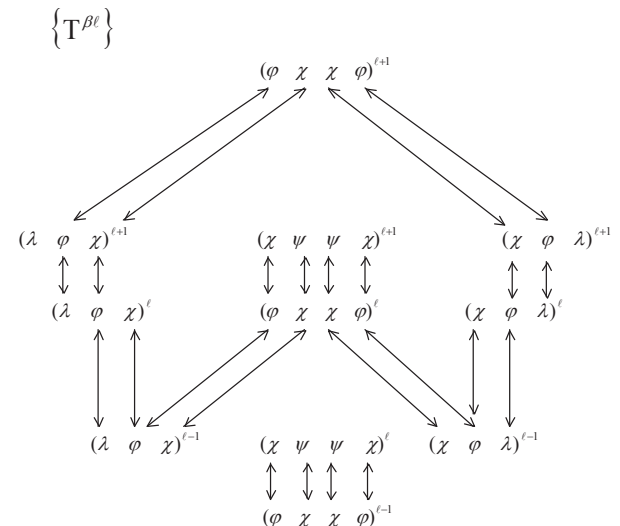


Fig.2 Interlevel connections in  $L^{S^\ell}$  (fragment).

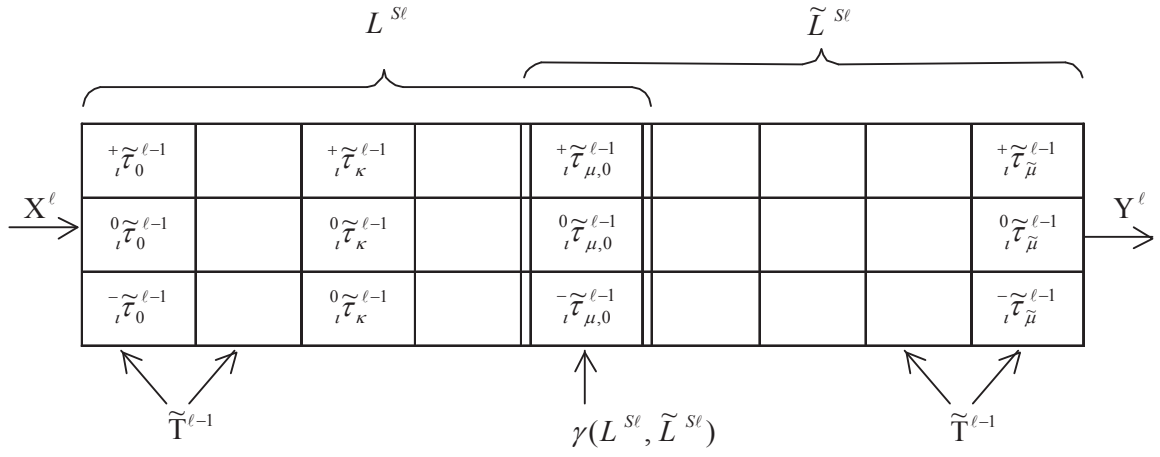


Fig.3. Construction of unit  $L^{S^\ell}$  with its prolongation  $\tilde{L}^{S^\ell}$ ; lower level units have diverse states in  $\{L^{S^\ell}, \tilde{L}^{S^\ell}\}$  field: neutral  $0\tilde{\tau}$  and opposite directed:  $+\tilde{\tau}$  and  $-\tilde{\tau}$ .

on the next basic construction  $\tilde{T}^\ell$ :

$$\{\tilde{?}, \tilde{\psi}, \tilde{\chi}, \tilde{\varphi}, \tilde{\lambda}\}^\ell \leftrightarrow \{+\tilde{?}, +\tilde{\psi}, +\tilde{\chi}, +\tilde{\varphi}, +\tilde{\lambda}\}^\ell.$$

$$\tilde{T}^\ell \leftrightarrow \{\beta \tilde{\tau}^\ell \leftrightarrow \tilde{\beta}^\ell : \beta \in L^\beta\}$$

The diagram  $\{\tilde{T}^{\beta^\ell}\}$  (Fig.2) describes the connections of fields  $\tilde{T}^{\beta^\ell}$ .

$$\begin{aligned} \tilde{\lambda}^\ell &\leftrightarrow \{-\tilde{\lambda}^\ell, 0\tilde{\lambda}^\ell, +\tilde{\lambda}^\ell\} \leftrightarrow \\ &\leftrightarrow \{\{\tilde{\lambda}, \tilde{\varphi}, \tilde{\chi}, \tilde{\psi}, \tilde{?}\}^\ell, \tilde{\varphi}^\ell, \{\tilde{?}, \tilde{\psi}, \tilde{\chi}, \tilde{\varphi}, \tilde{\lambda}\}^\ell\} \end{aligned}$$

$$\begin{aligned} \tilde{\varphi}^\ell &\leftrightarrow 0\tilde{\lambda}^\ell \leftrightarrow \{-\tilde{\varphi}^\ell, 0\tilde{\varphi}^\ell, +\tilde{\varphi}^\ell\} \leftrightarrow \\ &\leftrightarrow \{\{\tilde{\varphi}, \tilde{\chi}, \tilde{\psi}, \tilde{?}\}^\ell, \tilde{\chi}^\ell, \{\tilde{?}, \tilde{\psi}, \tilde{\chi}, \tilde{\varphi}\}^\ell\} \end{aligned}$$

$$\begin{aligned} \tilde{\chi}^\ell &\leftrightarrow 0\tilde{\varphi}^\ell \leftrightarrow \{-\tilde{\chi}^\ell, 0\tilde{\chi}^\ell, +\tilde{\chi}^\ell\} \leftrightarrow \\ &\leftrightarrow \{\{\tilde{\chi}, \tilde{\psi}, \tilde{?}\}^\ell, \tilde{\psi}^\ell, \{\tilde{?}, \tilde{\psi}, \tilde{\chi}\}^\ell\} \end{aligned}$$

Fig.3 gives an idea of construction of unit  $L^{S^\ell}$  and its prolongation  ${}_\omega\gamma^{\ell \leftrightarrow \ell} \leftrightarrow \tilde{L}^{S^\ell}$ , which connects  $L^{S^\ell}$  with the others discrete units of level  $\ell$  without the breaks. The prolongation arises in the unit outlook of the level space. Fig.4 describes the activity of  $L^S$ , when discrete levels are connected without the breaks too. The outlooks in the level space become the units of higher levels in this activity.

the other details of  $\tilde{T}^\ell$  are defined in line with this:

$$\{\tilde{\lambda}, \tilde{\varphi}, \tilde{\chi}, \tilde{\psi}, \tilde{?}\}^\ell \leftrightarrow \{-\tilde{\lambda}, -\tilde{\varphi}, -\tilde{\chi}, -\tilde{\psi}, -\tilde{?}\}^\ell,$$

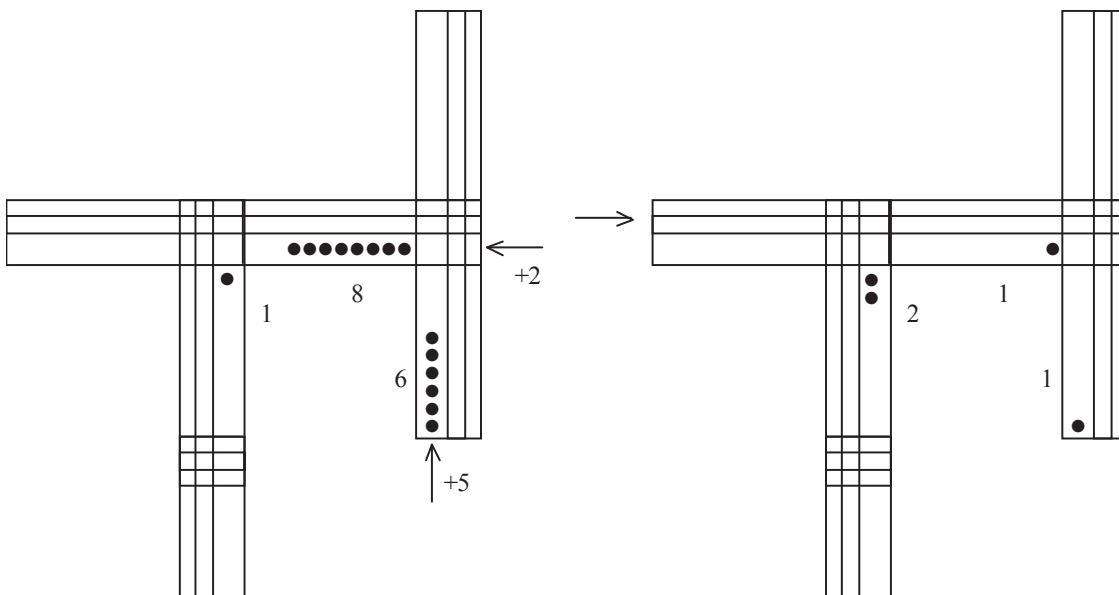


Fig.4. The uniting action in  $L^S$ :  $186+25=211$ .



Table R(\*).

$X^\ell \backslash C^\ell$	$-\lambda$	$\varphi$	$+\lambda$
$-\lambda$	$+\lambda$	$\varphi$	$-\lambda$
$\varphi$	$\varphi$	$\varphi$	$\varphi$
$+\lambda$	$-\lambda$	$\varphi$	$+\lambda$

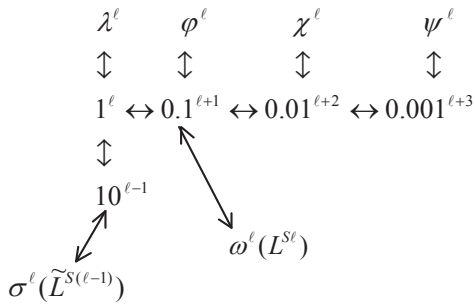
$\psi^\ell$   
 $\updownarrow$   
 $2 \leftrightarrow 0.001^{\ell+3}$

$$\sigma^\ell(\tilde{L}^{S(\ell-1)})$$

Table C(\*).

$X^\ell \backslash C^\ell$	$-\lambda$	$-\varphi$	$\chi$	$+\varphi$	$+\lambda$
$-\lambda$	$+\lambda$	$+\varphi$	$\chi$	$-\varphi$	$-\lambda$
$-\varphi$	$+\varphi$	$-\lambda$	$\chi$	$+\lambda$	$-\varphi$
$\chi$	$\chi$	$\chi$	$\chi$	$\chi$	$\chi$
$+\varphi$	$-\varphi$	$+\lambda$	$\chi$	$-\lambda$	$+\varphi$
$+\lambda$	$-\lambda$	$-\varphi$	$\chi$	$+\varphi$	$+\lambda$

In agreement with  $\{\tilde{T}^{\beta\ell}\}$ , the connections of number characteristics in  $L^S$  are described by the next way:



where  $1^\ell$  – the unit of level  $\ell$ ;  $m^{\ell-1}$ ,  $m^\ell$ ,  $m^{\ell+1}$ ,  $m^{\ell+2}$ ,  $m^{\ell+3}$  are (not obligatory equal) bases (the base is radix in given case).

The unit  $L^{S^\ell}$  works in the following way. At first  $\{L^{S^\ell}, \tilde{L}^{S^\ell}\}$  contains the neutral lower units and gets on the input  $X^\ell$  the lower units of diverse directions (signs); the uniting of opposite oriented units gives the neutral unit again. If an amount of identical directed units mounts to  $m^\ell$  then  $L^{S^\ell}$  sends to the level  $(\ell+1)$  the unit of level  $(\ell+1)$  and changes own state from  $\tilde{\varphi}^\ell$  in  $\tilde{\lambda}^\ell$ . In this state every unit  $L_i^{S^\ell}$  gives its prolongation  $\tilde{L}_i^{S^\ell}$  to the unit  $L_{i+1}^{S^\ell}$  and then inputs of level  $\ell$  is taken by  $L_{i+1}^{S^\ell}$ . In this way the

Table Z(\*).

$X^\ell \backslash C^\ell$	?	$+\psi$	$+\chi$	$+\varphi$	$+\lambda$
?	?	?	?	?	?
$+\psi$	?	$-\lambda$	$-\varphi$	$+\chi$	$+\psi$
$+\chi$	?	$+\varphi$	$-\lambda$	$-\psi$	$+\chi$
$+\varphi$	?	$-\chi$	$+\psi$	$-\lambda$	$+\varphi$
$+\lambda$	?	$+\psi$	$+\chi$	$+\varphi$	$+\lambda$

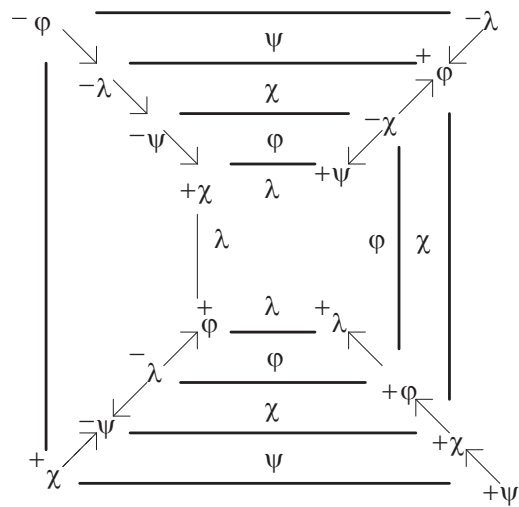


Fig.5. The diagram of quaternion multiplication

uniting action leads to the unit multiplying, when the new unit of its level arises in the level space.

State changing in the space  ${}^\beta L$  is the task of the coordinator  $S_0^\ell / L^S$  of unit  $L^S$ ; this task is carried out by the uniting and multiplying actions. The next tables on the contractions of  $\tilde{T}^\ell$  connects  $L^S$  with algebra systems.

The multiplication of real numbers is described by the tables of state changing function  $\mathbb{R}^*$  of  $S_0^\ell$  on the  ${}_R \tilde{T}^\ell$ :

$${}_R \tilde{T}^\ell \leftrightarrow \{-\tilde{\lambda}, \tilde{\varphi}, \tilde{\chi}, \tilde{\psi}\}^\ell \ \& \ \tilde{\varphi}^\ell \leftrightarrow 0^\ell \ \& \ \pm \tilde{\lambda}^\ell \leftrightarrow 1^\ell$$

The multiplication of complex numbers is described by the table  $\mathbb{C}^*$  on

$$\begin{aligned}
 {}_C \tilde{T}^\ell \leftrightarrow \{-\tilde{\lambda}, \tilde{\varphi}, \tilde{\chi}, \tilde{\psi}, \tilde{\lambda}\}^\ell \ \& \ \pm \text{Re}(\omega^\ell) \leftrightarrow \pm \tilde{\lambda}^\ell \ \& \\
 \pm \text{Im}(\omega^\ell) \leftrightarrow \pm \tilde{\varphi}^\ell \ \& \ \tilde{\chi}^\ell \leftrightarrow 0^\ell \ \& \ \omega^\ell \in C^\ell.
 \end{aligned}$$

The table  $\mathbb{Z}^*$  of quaternion multiplication and the diagram of this table (Fig.5) are defined on

$${}_z\tilde{T}^\ell \leftrightarrow \{\tilde{\lambda}, \tilde{\varphi}, \tilde{\chi}, \tilde{\psi}, \tilde{\gamma}, \tilde{\delta}, \tilde{\epsilon}, \tilde{\zeta}\}^\ell.$$

$\tilde{\gamma}^\ell \leftrightarrow 0^\ell$ ,  $\tilde{\lambda}^\ell$  – real coordinate,  $\tilde{\varphi}^\ell, \tilde{\chi}^\ell, \tilde{\psi}^\ell$  – imaginary coordinates.

All tables are formed from  $\{\tilde{T}^{\beta\ell}\}$  by the following way:

- the index  $i_c \in {}^\beta L$  of diverse states is the sign of  ${}_{ic}\tilde{\tau}^\ell$  in the initial state of space  $\tilde{T}^\ell$ : in this state  ${}_\lambda\tilde{\tau}^\ell$  is a center of coordinates;
- the index  $i_x \in {}^\beta L$  of inputs units (coordinating signals) is the sign of level  $i_x$ ;  $i_x$  becomes new center of coordinates;
- the changing of index in the new space of coordinates cannot repeat the results of the others lines in the tables.

In this way algebra systems and automats are defined by the means of  $L^S$ , but adverse act is impracticable because of  $L^S$  is the hierarchic multilevel unit with interlevel connections. The identification of number code with polynomial is a very heavy and widespread error of set theory based mathematics. The point is that the addition of numbers in  $L^S$  leads to the event, when the power of result exceeds the powers of addenda (the new level unit arises), but in the polynomial group (and in algebra in general) this event is forbidden. The named error is one of the main reasons of existent arithmetics systems incoherence with each other and with the laws of real level space. The similar errors arise because of the absence of number code theory. The practical significance of this theory creation was grounded by Lebeg (Lebeg H., 1938).

The images of integer, real, complex, hypercomplex numbers are described above by the strata of the outlook in the level space  $(\lambda, \varphi, \chi, \psi)$  of the numbers power (coordinator of the number space). It is coherent with the history of numbers creating. The real numbers were created in the uncertain field of the results of the acts with the integer numbers. The complex numbers arose when the results of the acts with real numbers were founded beyond the boundaries of real numbers. The arising of the every new strata of the number space changed all before created strata: the numbers images acquired new signs in their constructions.

Geometry unit  $G^\ell$  in aed theory is also hierarchic unit  $S^\ell$  and it has its own construction  $\sigma^{\ell-\tau}$ , the aggregated image  $\omega^\ell$  and the environment  $\sigma^{\ell+\tau}$  (other units beyond the boundaries  ${}_\omega\gamma^\ell$  of  $G^\ell$ ); for

measuring of  $G^\ell$  the metrical characteristic  $\mu^\ell$  is used. All geometry signs are described in number code of  $L^S$  arithmetics.

#### 4. AED PROCESSOR REALIZATIONS

Cybernetics technologies in single processors and their networks inherit the restrictions of mathematics means to the degree they realize them. Till now the onelevel theories remain the leading in the space of cybernetics technologies. Actual coherence with hierarchic mathematics may be attained only in future generations of cybernetic means.

Nevertheless the learning of existent processors and networks discovers their great abilities which are invisible in the frames of onelevel descriptions. These abilities are caused not by abstract (onelevel), but by real constructions of processors and networks, which are revealed in aed symbols and has the signs of hierarchical constructions.

Owing to that the trial realizations of aed processor were worked out on standard technical base.

The general processor for integer, real, complex and hypercomplex numbers was carried out as device.

Geometry design in software version of aed processor (IBM PC/AT, PASCAL language) has the signs of chemical, biological and other levels units creating, when the memory about the whole construction is realized in all construction details and the whole unit can be restored by one detail. It allows to carry out many tasks which are very heavy or irresistible in onelevel cybernetical technologies – when units movements in heterogeneous environments are caused not only by the external forces but also by their constructions changes. Among them

- running waves of changes in bodies which lead to mass movements;
- autowaves spreading and uniting (with new understanding of Belousov-Gabotinsky reaction);
- polymers movement through the membrane canal;
- snakes, caterpillars and wheels mechanisms movements.

Design&control tasks in large scale units of diverse levels are carried out by aed processors networks.

#### 5. HIERARCHIC KNOWLEDGE NETWORKS: HIGHWAY OF ARISING TIME

In agreement with aed statute the new power of hierarchic space arises in the interactions of knowledge units. The connections of the main

knowledge units (States) are realized by all their strata (natural, demographical, engineering and knowledge) and must be designed and controlled by the key constructions – knowledge networks. These networks in the course of time acquire the signs of cybernetics units which settle all directions of diverse States activity. They turn out into the real key to this activity (and thereby all States strata constructions) changing. However the cybernetic realizations of knowledge networks are created now in practice without the theoretical maintenance: onelevel mathematics theories can not describe their constructions and activity, the laws of their design&control in line with the laws of other real strata. The new networks, as well as all strata ignored by the power, have (increasing) bent to infringe the laws of all layers – scientific exchange, engineering units control et al. Besides for lack of knowledge networks theory their elaboration in many cases does not give the desired results. Moreover even huge outlay for strategic networks (as the networks for the processing of the date of Earth and space measuring by the space stations means) which are elaborated by the best forces of science and engineering strata, does not lead now to achievements in the State control. The data of measuring are mainly the dead weight and this outlay destroys the States (first of all their science) rather than strengthens them.

Aed statute gives a chance to elaborate the new highways of knowledge which will have direct contacts with all known and arising strata. It is the key to design&control of knowledge networks which will understand and connect the history, current states and arising strategies of knowledge units.

Hierarchical Multilevel Systems Laboratory in the collaboration with the UNIBEL (Belarus network joint with INTERNET), Belarus State University, Belarus Academy of Sciences and other scientific and applied institutes elaborates now the concrete realization of aed statute as knowledge network. It is coherent with real State construction and activity and unites the networks of diverse State strata; these networks contain changing image of higher unit and are able to restore the whole unit. Several among them (for microelectronics, laser raster and other technic devices design, for design&control in learning, art, science, currency institutes, engineering units, for oncological defense under conditions of radioactive and other contaminations of environment) have the maintenance of State power. The network for new State Statute (which connects all known strata in State own construction and its

interactions with other States ) is maintained by the arising State strata.

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# HIERARCHICAL MATHEMATICS: THEORY OF SWAY<sup>1</sup>

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Abstract: The paper considers the connections of hierarchical mathematics (aed theory) with the main cybernetic (sway) tasks - design, control and learning. The stages of sway process are defined by aed theory as the acts of uniting and multiplying in hierarchical time&space whose main law is described by the following statement: all strata arise in lower strata multiplying and uniting, create more high strata and are changed by higher strata activity. It means the new theory of mathematics constructs exact definition of sway process, and in its turn the sway process constructs the new strata in hierarchical time&space. Thereby the new statutes of mathematics are able to change all earlier strata and discover the new horizons of this time&space. Chimerical (described by diverse codes of habitual mathematics means) statutes of aed theory connect it with the best achievements of history of mathematics&cybernetics. Its new statute (symbol image of the whole hierarchical time&space) is described by its own code, more convenient in practice - in sway process realizing in concrete world strata: natural (physical, chemical, biological), demographical, engineering (industry, service, conveyance, trade, monetary mechanisms) and knowledge (languages, art, science, design and learning). *Copyright © 1998 IFAC*

Key words: hierarchical mathematics, aed-processor, sway, network.

## 1. REASONS OF HIERARCHICAL MATHEMATICS ARISING

Nowadays the main directions of cybernetics are design, control and learning - the stages of sway task in any world strata: natural, demographic, engineering and knowledge. Named strata (ordered in agreement with history of their arising) have

diverse characteristics in concrete States whose statutes (symbol images) must connect their history with sway strategies in their space. The States exchange diverse details of their own constructions on all strata (levels) and these interactions are base of States unions. Till now the process of world changing (new strata arising, States and States unions constructing) is realized without actual understanding of its laws and since that with hard errors whose scale increases. In order to correct that cybernetics must define new world image (Kile, 1995, Chestnut, 1995); and create convenient means of its design, control and learning which are constructed as networks of States and States unions (Groumos, 1995).

Sway (might) mechanism working with things of any strata in any knowledge uncertainty (from hazy images to exact figures) must carry out following tasks:

to create - in agreement with initial mathematical statute of hierarchical space - new thing construction&technology by way of its symbol image design and then control with it the process of lower strata things stratifying (its details selecting) and their interactions settling, to make its state and

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activity in the whole hierarchical space the most cohered with higher strata aims -  
- uniting act (design strategy);

to turn single designed thing into strata of its renovated states by way of its initial uniting act (with initial mathematical statute) renewal many times when haze in symbol images is removed and hesitant movements of creative work turn into well defined executive technology which discovers the horizons of new art -  
- multiplying act (learning strategy);

to change all acts when new mathematical statutes (new sway strata) arise in hierarchical space -  
- multiplying & uniting acts with mathematical statutes (learning & design in symbols area)

Key construction in sway technology is mathematical statute of hierarchical time&space. It contains:

strata of mathematics: symbol images (codes of records) with acts (laws) of their changing able to define the whole hierarchical time&space;

strata of concrete knowledge: images of all things in hierarchical space described by codes of its mathematics (and may be by other means which are beyond the might of existent mathematical codes).

Mathematical strata can contain many exact theories - their own statutes. The statute of mathematics must be thing (unit) able to connect any strata thing, its lower and higher strata. Hazy (arising) higher strata must be defined in it by sway strategy and higher strata creating must change all lower strata in hierarchical time&space.

Mathematics and concrete knowledge are the highest strata of hierarchical space in turn. Any changes in mathematics activates the waves of changing in all concrete strata since their new records have to renovate all sway acts in them, that is all their constructions and technologies. However multiplying acts of mathematics in hierarchical space always lead to new things with wider might in this space than one of their multiplied origin. Their uniting act creates their new mathematics. Moreover any concrete thing (instance of concrete knowledge) can activate the changes in all mathematical strata when it is beyond their might - belongs to the area of haze. All mathematical (exact) theories must be able to change their statute with alone instance which is beyond them. It is the main sign of exact theory.

Above made definement of sway mechanism allows to see its connections with mathematics. The construction of this definement answers to one of mathematical records which link certain and hazy

images. Design and learning strategies are defined in it as uniting and multiplying acts and at the same time as acts which remove knowledge uncertainty (turn existent haze of symbol images into exact figures and discover the new horizons of hierarchical time&space with new hierarchical haze) and select the things in controlled area (stratify this area with the defining of worth of its units).

Mathematical statute is considered as key of sway mechanism. Owing to that the sway definement discovers the significance of mathematics in sway activity. When its exact statute is away (when it is in hesitant (chaotic) state) this activity brings great hazard whose scale extends in higher strata.

However when the sway system can understand the level of uncertainty in its knowledge it can act with art strategy which allows to increase this level without a harm. Much worse events happen if sway unit cannot see errors in its statute and multiplies them in lower strata - the errors in reason (mathematical errors) are the most hard means of all strata destroying.

Since that the most significant task of any sway is

to construct mathematical statute of hierarchical space and to change it in agreement with this space changing. As concrete knowledge cannot be defined without exact theories the sway must have at least one exact theory in mathematical strata - statute of mathematics.

Mathematics which must be able to create exact symbol images of all things caught by sway process cannot make that by means of known axiomatic theories. There is no axiomatic theory which can remove its own contradictions, define all other constructions & technologies, connect them as their general statute, and discover the ways of their changing with growth of their abilities. The main constructions of practical mathematics&cybernetics - number codes and graphic images - till now have not exact definements in axiomatic theories. Wide spread understanding of number codes as polynomials is one of the most hard mathematics errors which underlies the technical processors:

number codes as well as graphic images are hierarchical constructions, their uniting act can create more high strata than united ones while algebra systems ban that. (The study of number codes has its origin in the works of H. Lebesque, 1938; then the try of movement to their defining was made by H. Simon, 1969. The investigations of graphic images with aim to define them in known theories were always unlucky.) The abilities of axiomatic theories in defining of creative work are still less, while the art strategies are contained in

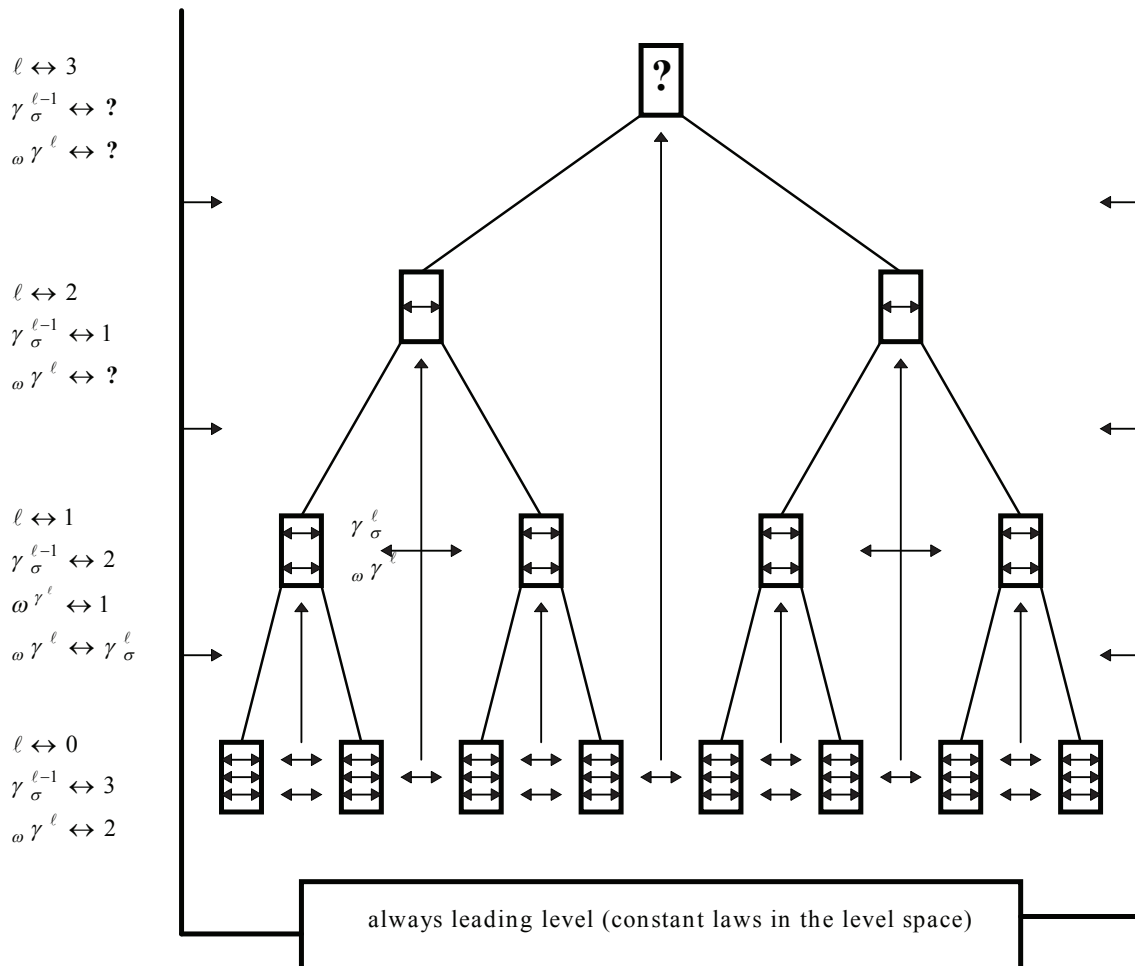


Fig.1. Exact (graphic-number) image of onelevel world outlook kinds. They are based on the understanding of system as the construction which connects its own details stronger than its connections with other systems in its environment.  $\omega^{\ell}$  - system of level  $\ell$ ,  $\sigma^{\ell-1}$  - its construction,  $\omega \gamma^{\ell}$  - its connections in its holding system, which has the construction  $\sigma^{\ell}$  with the connections  $\gamma_{\sigma}^{\ell}$ ;  $\omega^{\ell}$  are defined by the rectangles,  $\gamma^{\ell}$  - by the arrows, and arrows number is the measure of connection. These measure decreases with level increasing and higher systems cannot control the constructions and activity of lower systems. The construction of the last holding system cannot be described by system axioms, it means that the constant laws (axioms) of system are incomplete or contradictory.

sway activity which must create with them the new things and new laws of their control.

It is reasoned by onelevel world outlook which underlies all axiomatic theories (among them set theory). In line with it the connections in system construction are more strong than system connections with their holding constructions, the laws of levels weaken with level increasing, and only one (initial) level is always leading in the level space.

General image of all onelevel theories of mathematics and cybernetics on Fig.1 allows to see the boundaries of widespread understanding of abstract system and the boundaries of knowledge networks and processors based on this understanding. The systems are defined on Fig.1 by

the rectangles, their connections - by certain numbers of arrows; the measures of systems internal connections outnumber the measures of connections in their holding systems as well as in widespread understanding. As the result the details look as indivisible atoms in holding systems and the last holding system is the set - chaotic construction with untied acts of its atoms, which does not control the atoms activity, not to mention their constructions changing.

The using of this system understanding in knowledge networks creation restricts their abilities. The existent knowledge networks are limited in design tasks carrying out when lower levels units and acts must be changed by higher levels (created in their interactions).

The best of all for sway aims in current cybernetics is twolevel system (Mesarovic, *et al.*, 1970). However it is defined as symbol realization of onelevel world outlook: its coordinator cannot see the internal constructions and activity of lower levels systems, their laws are stronger than the laws of their interactions in higher levels. That's why twolevel system was extended to the whole level space and its new state has got its own name - aed (Aed is Hellenic word and it means the changing symbol unit with unlimited outlook in the level space.) At first aed realization was chimerical - described by diverse knowledge means: twolevel system, dynamic systems (Mesarovic and Takahara, 1975), geometry and number code. Then all named and other knowledge means were described by initial realization as aed connected states (Novikava, *et al.*, 1990). Now aed theory has its own language with new graphics and more fine settlement of the knowledge space.

## 2. AED STATUTE IN MATHEMATICS SYMBOLS

Aed theory describes new world outlook cohered with the main law of level space dynamics: all strata arise in lower strata multiplying and uniting, create more high strata and are settled by higher strata might. In agreement with level increasing law the leading laws are ones of the highest current strata and they change all earlier strata. The main law may be changed by new (arising) times. This theory is beyond set theory boundaries, but it remains in mathematics as exact science.

Now the hierarchical space contains physics, chemistry, biology, demography, engineering and knowledge strata (Novikava, *et al.*, 1991; 1995; 1997). They were created by the uniting and multiplying strategy and current highest level is knowledge. It contains language, art, learning, design&science. Its activity changes engineering level (industry, service, conveyance, trade, monetary mechanisms), gives new stratification of demography units (creative work belongs to the most considerable strata), reconstructs all known strata and maintains new strata arising.

Mathematics statute  $S^\ell$  considered below unites the codes of twolevel system and general systems theory by (Mesarovic, *et al.*, 1970; Mesarovic and Takahara, 1975), number code  $L$  (Lebesque, 1938) geometry (G) and cybernetics technologies (CT) methods. Then (in multiplying act) they are described by aed means. The details of aed chimerical statute  $S^\ell$  are the aed strata: level (time), unit (state), construction (contents), act (process), statute (laws, connections), sway (coordinator) and

outlook in the level space (field of arising levels). They are united by the main law of hierarchical time&space.

$S^\ell$  is described by following symbol construction:

$$S^\ell \leftrightarrow \{ \omega, S_0, \sigma \}^\ell$$

$\omega^\ell$  - aggregated dynamic realization of the units and acts,  $\sigma^\ell$  - construction,  $S_0^\ell$  - coordinator,  $\ell$  - index of level,  $\ell \in L$ .

$$\omega^\ell \leftrightarrow \{ \tilde{\omega}, S_0 \}^\ell, \sigma^\ell \leftrightarrow \{ S_0, \tilde{\sigma} \}^\ell,$$

$\tilde{\omega}^\ell$  and  $\tilde{\sigma}^\ell$  are connected by  $S_0^\ell$  and contain the dynamic realizations and constructions of unit (object)  ${}_o S^\ell$ , its environment  ${}_\varepsilon S^\ell$  (other units of its level), acts (processes)  ${}_{o\pi} S^\ell$  of  ${}_o S^\ell$  in  ${}_\varepsilon S^\ell$  and acts  ${}_{\pi\varepsilon} S^\ell$  of  ${}_\varepsilon S^\ell$  with  ${}_o S^\ell$ :

$$\{ {}_o S, {}_{o\pi} S \}^\ell \leftrightarrow S^{\ell \pm 0}, \{ {}_{\pi\varepsilon} S, {}_\varepsilon S \}^\ell \leftrightarrow S^{\ell \pm \tau};$$

that is level  $\ell$  is discovered in the interlevel connections:

$$\begin{aligned} \tilde{\omega}^\ell &\leftrightarrow \{ \{ {}_o \omega, {}_{o\pi} \omega \}, {}_{\omega} \gamma, \{ {}_{\pi\varepsilon} \omega, {}_\varepsilon \omega \} \}^\ell \leftrightarrow \\ &\leftrightarrow \{ \{ \omega^{\ell \pm 0}, {}_{\omega} \gamma^\ell, \{ \omega^{\ell \pm \tau} : \tau \in L, \tau \neq 0 \} \} \}^\ell \leftrightarrow \\ &\leftrightarrow \{ \{ \omega^{\ell \pm \tau} : \tau \in L \}, {}_{\omega} \gamma \}^\ell \end{aligned}$$

$$\begin{aligned} \tilde{\sigma}^\ell &\leftrightarrow \{ \{ \{ \omega_i : i \in I \}^{\ell \pm \tau} : \tau \in L \}, {}_{\sigma} \gamma \}^\ell \leftrightarrow \\ &\leftrightarrow \{ \{ \sigma^{\ell \pm \tau} : \tau \in L \}, \omega^{\ell \pm 0} \}^\ell. \end{aligned}$$

$\tilde{\omega}^\ell$  contains the dynamic systems

$${}_k \omega^\ell \leftrightarrow {}_k (\bar{\rho}, \bar{\varphi})^\ell, k \in {}_k L \leftrightarrow \{ o, o\pi, \pi\varepsilon, \varepsilon \},$$

${}_{\omega} \gamma^\ell$  - connections of  $\omega^\ell$  with other units and acts, and the construction of  ${}_{\omega} \gamma^\ell$  connects the details of  ${}_k (\bar{\rho}, \bar{\varphi})^\ell$  (their states  ${}_k C^\ell$ , inputs  ${}_k X^\ell$  and outputs  ${}_k Y^\ell$ ):

$${}_{\omega} \gamma^\ell \leftrightarrow \{ {}_k \{ X, C, Y \} : k \in {}_k L \}^\ell$$

${}_k (\bar{\rho}, \bar{\varphi})^\ell$ :

$$\begin{aligned} {}_k \bar{\rho}^\ell &= {}_k \{ \rho_t : C_t \times X_t \rightarrow Y_t \& t \in T \}^\ell \\ {}_k \bar{\varphi}^\ell &= {}_k \{ \varphi_{t'} : C_t \times X_{t'} \rightarrow C_t \& t, t' \in T \& t' > t \}^\ell \end{aligned}$$

Table  $\omega\gamma^\ell$

$\omega\gamma^\ell$	States	Inputs	Outputs
${}_o S^\ell$	${}_o C^\ell$	${}_o X^\ell \leftrightarrow X^{\ell \leftarrow (\ell \pm \tau)}$	${}_o Y^\ell \leftrightarrow {}_o C^\ell$
${}_{o\pi} S^\ell$	${}_{o\pi} C^\ell \leftrightarrow {}_0 X^\ell$	${}_{o\pi} X^\ell \leftrightarrow {}_o C^\ell$	${}_{o\pi} Y^\ell \leftrightarrow Y^{\ell \rightarrow (\ell \pm \tau)}$
${}_{\pi\varepsilon} S^\ell$	${}_{\pi\varepsilon} C^\ell \leftrightarrow {}_\varepsilon X^\ell$	${}_{\pi\varepsilon} X^\ell \leftrightarrow {}_\varepsilon C^\ell$	${}_{\pi\varepsilon} Y^\ell \leftrightarrow \{Y^{\ell \rightarrow (\ell \pm \tau)}\},$ $Y^{\ell \rightarrow (\ell \pm \tau)}\}$
${}_\varepsilon S^\ell$	${}_\varepsilon C^\ell$	${}_\varepsilon X^\ell \leftrightarrow \{X^{\ell \rightarrow (\ell \pm \tau)}\},$ $X^{\ell \rightarrow (\ell \pm \tau)}\}$	${}_\varepsilon Y^\ell \leftrightarrow {}_\varepsilon C^\ell$

The network of connections of  ${}_k C^\ell, {}_k X^\ell, {}_k Y^\ell$  is described by Table  $\omega\gamma^\ell$ .

$S^{\ell \pm \tau} (\tau \neq 0)$  has details, which have increasing uncertainty in the signs of  $S^{\ell \pm 0}, S^{\ell \pm 0}$  sets  $Y^{\ell \rightarrow (\ell \pm \tau)}$  and gets  $X^{\ell \leftarrow (\ell \pm \tau)}$  - outputs of level  $\ell$  to the lower  $Y^{\ell \rightarrow (\ell - \tau)}$  and higher  $Y^{\ell \rightarrow (\ell + \tau)}$  levels and inputs from levels  $\ell - \tau$  and  $\ell + \tau$  ( $X^{\ell \leftarrow (\ell - \tau)}, X^{\ell \leftarrow (\ell + \tau)}$ ); states  ${}_o C^\ell$  are own inputs and outputs of level  $\ell$ :

$${}_o C^\ell \leftrightarrow \{X^{\ell \rightarrow \ell}, Y^{\ell \rightarrow \ell}\}$$

Thanks to the connections in  $\omega\gamma^\ell$  any detail of  $\omega^\ell$  is restored (renovated) by its other details with becoming uncertainty.

The coordinator (sway unit) is described by the following way:

$$S_0^\ell \leftrightarrow \{\omega, S_0, \sigma\}_0^\ell,$$

that is  $S_0^\ell$  has its own aggregated dynamic realization  $\omega_0^\ell$  and the construction  $\sigma_0^\ell$ ; the availability of  $S_{00}^\ell$  (the connection with higher levels) allows to account and to change  $S_0^\ell$  by its own activity.

Let  $\lambda \leftrightarrow \ell \pm \tau_\lambda, \varphi \leftrightarrow \lambda \pm \tau_\varphi, \chi \leftrightarrow \varphi \pm \tau_\chi,$   
 $\psi \leftrightarrow \chi \pm \tau_\psi, \quad ? \leftrightarrow \psi \pm \tau_?, \quad \text{etc.},$   
 ${}^\beta L \leftrightarrow \{\lambda, \varphi, \chi, \psi, ?, \dots\}.$

Then  $S_{00}^\ell \leftrightarrow {}^\beta S_0^\ell \& \beta \in L^\beta$ ;  ${}^\beta S_0^\ell$  is the contraction of field  $S^\beta$  on the  $S^{\ell \cdot \beta} S_0^\ell \leftrightarrow S^\beta / S^\ell$  and

$${}^\lambda S_0^\ell \leftrightarrow \{\lambda, \omega, {}^\varphi S_0, \lambda, \sigma\}_0^\ell$$

$${}^\varphi S_0^\ell \leftrightarrow \{\varphi, \omega, {}^\chi S_0, \varphi, \sigma\}_0^\ell$$

$${}^\chi S_0^\ell \leftrightarrow \{\chi, \omega, {}^\psi S_0, \chi, \sigma\}_0^\ell$$

...

The fields  ${}^\beta S_0^\ell$  are strata of  $S_0^\ell$  and  $\beta$  is outlook in the time&space. The haze (knowledge uncertainty) of  $S_0^\ell$  is increased with the distance from  $\ell$ . Every level  $\beta\tau$  of haze on every sway stratum  ${}^\beta S_0^\ell$  has its own coordinating (sway) strategy. The strategies of  ${}^\lambda S_0^\ell$  (processes  ${}_{o\pi} S_0^\ell$ ) connect the changes of constructions  $\sigma^{\ell - \tau}$  and  $\sigma^{\ell + \tau}$  with the using of  $\omega^\ell$ . The act of key unit  $\omega^\ell$  creation in  $\sigma^{\ell - \tau}$  is uniting process, the act of  $\sigma^{\ell + \tau}$  creation, when  $\ell$  is the highest level, is the multiplying process with the original (initial) unit  $\omega^\ell$ .

The changing of strategies  ${}_{o\pi} S_0^\ell$  as far as one can is executed by stratum  ${}^\varphi S_0^\ell$  and it is controlled by following strata. At the same time the outlook in the level space extends from  $\lambda \leftrightarrow \ell \pm \tau_\lambda$  to  $\varphi \leftrightarrow \lambda \pm \tau_\varphi$  and so on.

Haze removing (its turning into exact figures and new horizons discovering with new hierarchical haze) in  $S_0^\ell$  outlook is equivalent of system order increasing (increasing of interactions level), when  ${}^\lambda S_0^\ell$  realizations are united and multiplied by  ${}^\beta S^\ell$  ( $\beta > \lambda$ ), which realize the level (time) increasing process in hierarchical time&space  $S^\ell$ , time  $\ell$  creates time  $\beta$ , and  $S_0^\ell$  (the sway of time  $\ell$ ) turns into strata of units with their new sway  $S_0^\beta$ .

In agreement with the run of events in time increasing process the uniting stage (aed chimerical statute  $S^\ell$  creation in known mathematics and cybernetics fields) activates the multiplying act which realizes the defining of known means ( $L, (\bar{p}, \bar{\varphi}), G, CT$  and other) by aed technology (Novikava *et al* 1995, 1996, 1997).

However much more convenient in theory and practice is new statute of hierarchical space which contains all details of  $S^\ell$  (its own strata) linked by their connections in the process of level increasing. All aed strata have in its new statute their exact definements like to its main symbol images,



constructed on the base of  $S^\ell$  and block-arrow image of hierarchical system by P. Groumpos (P. Groumpos, 1995).

New statute  $A^\lambda$  has two its own symbol images  ${}^x\alpha^\lambda$  and  ${}^+\alpha^\lambda$ . The image  ${}^x\alpha^\lambda$  connects  $A^\lambda$  with the records of habitual mathematics while the image  ${}^+\alpha^\lambda$  is more convenient in the constructing of new technical devices - aed processors. Aed strata are:  $\Lambda, \lambda$  - level (time),  $\Gamma, \gamma$  - statute (law, connection),  $P, \rho$  - act (process),  $\Omega, \omega$  - unit (state),  $\Sigma, \sigma$  - construction (contents),  $B, \beta$  - new level (arising time),  $A, \alpha$  - sway (coordinator). Aed statute  $A^\lambda$  in current level  $\Lambda, \lambda$  is described by its symbol image  ${}^x\alpha^\lambda$  in following way:

$${}^x\alpha^\lambda:$$

$$A^\lambda \xleftrightarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega A^\lambda \\ \rho \sigma \end{matrix} \right\} \xrightarrow[\rho]{\lambda} A^\lambda \rightarrow \beta$$

$$\Lambda^\lambda \xleftrightarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \Lambda^\lambda \\ \rho \sigma \end{matrix} \right\} \xrightarrow[\rho]{\lambda} \Lambda^\lambda \rightarrow \beta$$

$$\Gamma^\lambda \xleftrightarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \Gamma^\lambda \\ \rho \sigma \end{matrix} \right\} \xrightarrow[\rho]{\lambda} \Gamma^\lambda \rightarrow \beta$$

$$P^\lambda \xleftrightarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega P^\lambda \\ \rho \sigma \end{matrix} \right\} \xrightarrow[\rho]{\lambda} P^\lambda \rightarrow \beta$$

$$\Omega^\lambda \xleftrightarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \Omega^\lambda \\ \rho \sigma \end{matrix} \right\} \xrightarrow[\rho]{\lambda} \Omega^\lambda \rightarrow \beta$$

$$\Sigma^\lambda \xleftrightarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega \Sigma^\lambda \\ \rho \sigma \end{matrix} \right\} \xrightarrow[\rho]{\lambda} \Sigma^\lambda \rightarrow \beta$$

$$B^\lambda \xleftrightarrow[\rho]{\gamma} \left\{ \begin{matrix} \beta^\gamma \\ \omega B^\lambda \\ \rho \sigma \end{matrix} \right\} \xrightarrow[\rho]{\lambda} B^\lambda \rightarrow \beta$$

$$A^\beta \xleftrightarrow[\rho]{\gamma} \left\{ \begin{matrix} ?^\gamma \\ \omega A^\beta \\ \rho \sigma \end{matrix} \right\} \xrightarrow[\rho]{\lambda} A^\beta \rightarrow \beta$$

In this way all aed strata are defined by its original unit  $A^\lambda$ , they have all its signs and abilities. For instance  $P^\lambda$  (act) may be defined as unit, it has its own laws, its construction contains the acts  ${}^+\rho^\lambda$  and  ${}^x\rho^\lambda$  with their new horizons (outlooks)  ${}^+\beta^\lambda$  and  ${}^x\beta^\lambda$ . The strata  $\Lambda, \Gamma, B, P, \Sigma, \Omega$  have like images (discrete units) which are strongly connected by their original-unit  $A^\lambda$  and by the details of their own constructions. Thanks to that all aed strata may be renovated when any stratum is changed. The acts of original unit  $A^\lambda$  multiplying and their symbol

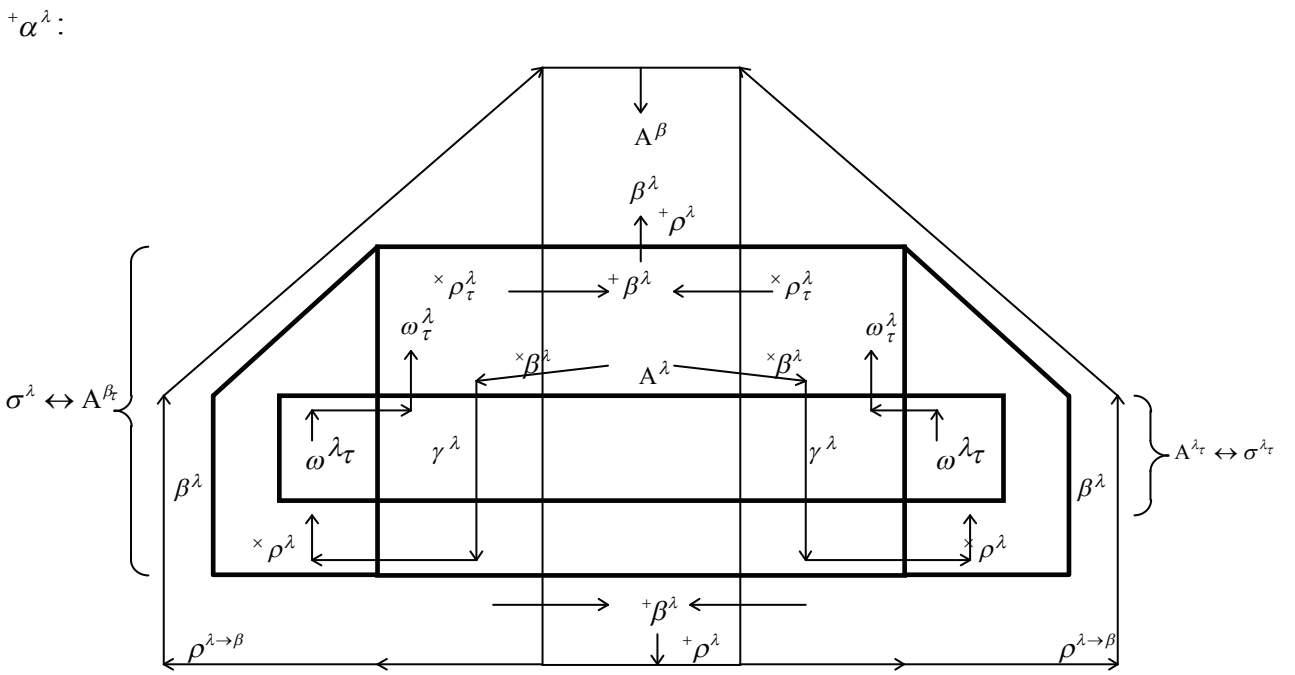


Fig.2 Symbol image of aed processor.

image uniting lead to the arising of the new time unit  $A^\beta$  which has hazy strata in its image (they are signed by the symbol  $\rho$  and they will be defined in time  $\beta$ ) (S. Novikava *et al.*, 1997). All concrete strata of the world with their history and future strategies are defined by aed statute (by hierarchical mathematics) when aed strata are realized in concrete signs of hierarchical time&space. The image  $^+\alpha^\lambda$  allows to see the whole process of level increasing in hierarchical time&space  $A^\lambda : A^\lambda$  - original state of aed ( $A^\lambda \leftrightarrow \omega^\lambda$ ),  $A^\beta$  - its leading state in time  $\lambda$ ; multiplying act  $^*\rho^\lambda$  of original order  $\gamma^\lambda$  (original statute of  $A^\lambda$ ) executes learning process in the units  $\omega^{\lambda\tau}$  of construction  $\sigma^{\lambda\tau}$  which was created in time  $\lambda_\tau$ ; thanks to that the units  $\omega^{\lambda\tau}$  turn into the ordinary units  $\omega_\tau^\lambda$  in the new construction  $\sigma^\lambda$ ; uniting act  $^+\rho^\lambda$  in  $\sigma^\lambda$  connects the ordinary units  $\omega_\tau^\lambda$  and create the new sway  $\omega^\beta \leftrightarrow A^\beta$ ; in the process  $\rho^\lambda$  the image of arising time  $\beta^\lambda$  has two strata -  $^*\beta^\lambda$  and  $^+\beta^\lambda$  which answer two stages of this process:  $^*\rho^\lambda$  and  $^+\rho^\lambda$ .

### 3. HIERARCHICAL SWAY NETWORK: AIM, CONSTRUCTION, TECHNOLOGY, LAW

The instances of exact defining of all known strata (natural, demographical, engineering and knowledge) and their practical realizations are considered in many papers of authors (Novikava *et al.*, 1995; Groumpos *et al.*, 1997). The most significant among them are aed-processors (technical devices with wider abilities in practice of design&control & learning than existent ones) and exact image of sway networks (swaynets) aimed at the coordination of States and States unions in the space of strata named above. The new processors and sway networks meet all requirements of large scale systems which are beyond the might of known means of mathematics&cybernetics. The main characteristics of statute of hierarchical swaynet are considered below.

#### 3.1. The swaynet must allow to define the world:

- to learn its history,
- to measure its current state,
- to design its new image,
- to execute its changing strategy.

on all its strata (levels) - natural (physical, chemical, biological), demographical, engineering (industry, service, conveyance, trade, monetary mechanisms), and knowledge (languages, art, design, science, learning, State power institutes (legislative, executive and justice power)).

#### 3.2. The construction of swaynet contains two ranges (layers, strata):

the field of States swaynets (ordinary units layer); the ordinary swaynets are constructed with taking into account and connecting the internal constructions of their States defined in the world space strata, their activity as the units in their environment (their interacts, exchange by diverse strata details), and their current key unit; the States swaynets are the property of their States and they can have the covert details in their constructions; their diversity allows to realize their exchange (including the exchange by knowledge strata details) and the laws of that exchange are the base of their highest strata creating;

the key unit (key range) of world swaynet; the key (sway) unit has its statute and the means of its activity maintenance in all strata (among them the means of mathematics&cybernetics able to carry out all swaynet tasks); it is constructed by the ordinary units in agreement with the main tasks of the swaynet; it answers for the increasing of wellbeing of all lower strata in the world and stratifies the lower units in the ranges cohered with their contributions in its creating and activity; the sway unit is symbol image of the whole hierarchical space of its arising time, it has the turns uncertain in that time, it has direct contacts with all lower strata, maintains their diversity, connects them, changes them by the highest achievements settling in their own constructions in agreement with their will, creates the means of its own changing, and discovers the way of new strata creating in the world space.

#### 3.3 The strategy (technology) of swaynet has two main stages:

uniting (design); design technology activates the exchange in the world strata space, unites the existent statutes and interacts laws of ordinary swaynets, and creates the new statute of the whole swaynet, its new key unit with its highest strategy and the means of this strategy executing by the sway unit and its realizing in all lower strata;

multiplying (learning); learning technology defines the ordinary units and all lower strata in the symbols of their current highest statute, changes them by the multiplying of highest achievements in their own constructions in line with their will, magnifies their might to the mark more high than the one of their current key unit, create the new diversity in all world strata, and discovers the way of new key statute design in the field of diverse ordinary units learned and stratified in agreement with their contributions in the process of world level increasing; any learned detail of world swaynet is able to renovate it with the

increasing of its abilities and the decreasing of outlay in its activity;

all ordinary units of world swaynet have equal rights in its uniting stage and in multiplying stage they are stratified along the new sway ranges in line with these rights realizing by them;

sway rights in the world swaynet space are realized by the ordinary ranges and the key units in turn: the ordinary ranges have sway rights in the uniting stage, the key units have sway rights in the multiplying stage.

### 3.4 The main law of swaynet:

all strata arise in lower strata multiplying and uniting, create more high strata, and are changed by higher strata activity.

## 4. CONCLUSION

Unlike axiomatic theories the original statute of new mathematics (considered above with history of its chimerical image) is changeable and it contains the strategy of its changing. This statute meets all requirements of sway (design&control&learning) tasks and discovers the new ways of their carrying out in large scale systems.

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# MATHEMATICS CONSTRUCTIONS IN AED THEORY<sup>1</sup>

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Abstract: The paper contains symbol image of aed (original statute of hierarchical mathematics) and the defining of the main construction & technologies of mathematics & cybernetics by aed means. In this way aed statute (whose chimerical image was constructed in the act of uniting of named constructions & technologies) is multiplied in the space of its details. Thanks to that they are turned into connected states of original statute (key unit of the whole hierarchical time & space) and acquire all its abilities, more wide than their own ones and more convenient in sway (design & control & learning) process realizing. *Copyright © 1998 IFAC*

Key words: aed statute, mathematics constructions & technologies

## 1. THE STATUTE OF HIERARCHICAL MATHEMATICS

Mathematics & cybernetics area belongs to large scale systems and scale of its might increases in hierarchical time & space (which contains now following connected strata: natural (physical, chemical, biological), demographical, engineering (industry, service, conveyance, trade, monetary mechanisms) and knowledge (languages, art, science, design and learning)).

Now the main law of hierarchical time & space is described by the following statement: all strata arise in lower strata multiplying and uniting, create more high strata and are changed by higher strata activity. It is the statute of hierarchical mathematics - aed theory. The main reasons of its arising were internal incoherence of the area of habitual mathematics (whose directions are unaccountable by one another) and the unlucky tries of this area in the carrying out of sway tasks

in hierarchical space which are beyond the might of habitual axiomatic theories.

Mechanism of sway (might) realizing allows to increase hierarchical time (to create the new strata and to change all earlier ranges). Since that this mechanism which connects the main directions of cybernetics (they are design, control and learning - the stages of sway process) was considered as the base of new theory. The stage of design is uniting act in it and the stage of learning is multiplying act (control process connects these stages). The earlier symbol constructions (number codes, graphic images, twolevel and dynamic systems) were considered as the details of the key unit of arising theory. This unit has got its own name - aed.

Aed is Hellenic word and it means the changeable symbol unit with unlimited outlook in time & space.

At first aed realization was chimerical - described by its own details (by the codes named above). Then the chimerical statute of aed was turned into well defined thing with its own symbol codes (images) which are connected with earlier symbol constructions of mathematics & cybernetics

New statute  $A^\lambda$  has two its own symbol images:  ${}^x\alpha^\lambda$  and  ${}^+\alpha^\lambda$ . The image  ${}^x\alpha^\lambda$  connects  $A^\lambda$  with the records of habitual mathematics while the image  ${}^+\alpha^\lambda$  is more convenient in the constructing of new technical devices - aed processors. Aed strata are:  $\Lambda, \lambda$  - level (time, stratum),  $\Gamma, \gamma$  - statute (law, connection, symbol image, figure),  $P, \rho$  - act (process),  $\Omega, \omega$  - unit (state)  $\Sigma, \sigma$  - construction (contents),  $B, \beta$  - new level (arising time),  $A, \alpha$  - sway (coordinator). Aed statute  $A^\lambda$  in current level  $\lambda$  is described by its symbol image  ${}^x\alpha^\lambda$  in following way:  ${}^x\alpha^\lambda$ :

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$$\begin{aligned}
A^\lambda &\xleftrightarrow[\rho]{\gamma} \left\{ \beta^\gamma \omega^\lambda A^\lambda_\sigma \right\} \xrightarrow[\rho]{A^\lambda} \beta \\
\Lambda^\lambda &\xleftrightarrow[\rho]{\gamma} \left\{ \beta^\gamma \omega^\lambda \Lambda^\lambda_\sigma \right\} \xrightarrow[\rho]{\Lambda^\lambda} \beta \\
\Gamma^\lambda &\xleftrightarrow[\rho]{\gamma} \left\{ \beta^\gamma \omega^\lambda \Gamma^\lambda_\sigma \right\} \xrightarrow[\rho]{\Gamma^\lambda} \beta \\
P^\lambda &\xleftrightarrow[\rho]{\gamma} \left\{ \beta^\gamma \omega^\lambda P^\lambda_\sigma \right\} \xrightarrow[\rho]{P^\lambda} \beta \\
\Omega^\lambda &\xleftrightarrow[\rho]{\gamma} \left\{ \beta^\gamma \omega^\lambda \Omega^\lambda_\sigma \right\} \xrightarrow[\rho]{\Omega^\lambda} \beta \\
\Sigma^\lambda &\xleftrightarrow[\rho]{\gamma} \left\{ \beta^\gamma \omega^\lambda \Sigma^\lambda_\sigma \right\} \xrightarrow[\rho]{\Sigma^\lambda} \beta \\
B^\lambda &\xleftrightarrow[\rho]{\gamma} \left\{ \beta^\gamma \omega^\lambda B^\lambda_\sigma \right\} \xrightarrow[\rho]{B^\lambda} \beta \\
A^\beta &\xleftrightarrow[\rho]{\gamma} \left\{ ?^\gamma \omega^\lambda A^\beta_\sigma \right\} \xrightarrow[\rho]{A^\beta} ?
\end{aligned}$$

In this way all aed strata are defined by its original unit  $A^\lambda$ , they have all its signs and abilities. For instance  $P^\lambda$  (act) may be defined as unit, it has its own laws, its construction contains the acts  $^+ \rho^\lambda$  and  $^\times \rho^\lambda$  with their outlooks  $^+ \beta^\lambda_\rho$  and  $^\times \beta^\lambda_\rho$ . The strata  $\Lambda, \Gamma, B, P, \Sigma, \Omega$  have like images (discrete units) which are strongly connected by their original-unit  $A^\lambda$  and by the details of their own constructions. Thanks to that all aed strata may be renovated when any stratum is changed. The acts of original unit  $A^\lambda$  multiplying and their new symbol images uniting leads to the arising of the new time unit  $A^\beta$  which has hazy strata in its image (they are signed by the symbol ? and they will be defined in time  $\beta$ ). All concrete strata of the world with their history and future strategies are defined by aed statute (by hierarchical mathematics) when aed strata are realized in concrete signs of hierarchic space.

The image  $^+ \alpha^\lambda$  (Fig. 1.) allows to see the whole process of level increasing in hierarchical space.  $A^\lambda$  - original state of aed ( $A^\lambda \leftrightarrow \omega^\lambda$ ),  $A^\beta$  - its leading state in time  $\lambda$ ; multiplying act  $^\times \rho^\lambda$  of original order  $\gamma^\lambda$  (original statute of  $A^\lambda$ ) creates the construction  $\sigma^\lambda$ . Then the uniting one in  $\sigma^\lambda$  connects the ordinary units  $\omega^\lambda_\tau$  and creates the new sway  $\omega^\beta \leftrightarrow A^\beta$ ; in process  $\rho^\lambda$  the image of new time  $\beta^\lambda$  has two strata -  $^\times \beta^\lambda$  and  $^+ \beta^\lambda$  which answer two stages of this process:  $^\times \rho^\lambda$  and  $^+ \rho^\lambda$ .

$^+ \alpha^\lambda$ :

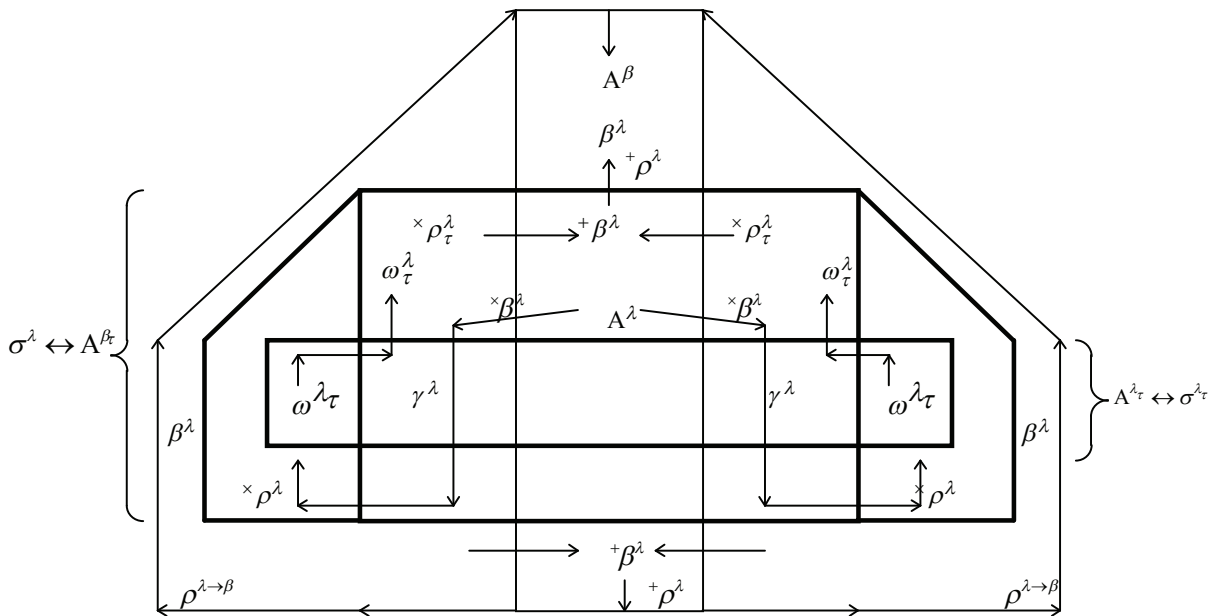


Fig.1 Symbol image of aed processor.

2. THE MAIN KNOWLEDGE  
CONSTRUCTIONS IN AED THEORY

Twollevel system and dynamic systems  $(\bar{\rho}, \bar{\varphi})$  (by M.Mesarovic and Y. Takahara) are described as aed contraction. This result is almost obvious. Since  $(\bar{\rho}, \bar{\varphi})$  is generalization of all existent set theory means, they are turned into coordinated details of hierarchical mathematics. Besides they acquire wider abilities than their own ones in earlier time for habitual and new tasks carrying out.

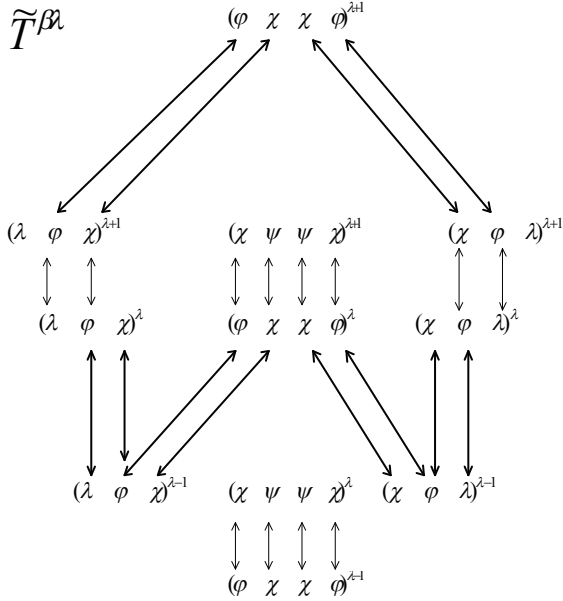


Fig.2 Interlevel connections in  $\Lambda^\lambda$  (fragment).

The description of number code  $\Lambda^\lambda$  is more heavy task. Existent number code has not all signs of  $\Lambda^\lambda$ : their higher levels cannot change the construction and activity of lower units. In aed theory it acquires these signs. The most considerable states of number code (from integer to hypercomplex

numbers) are described by the standard unit  $\Lambda^\lambda$ , founded on the next basic construction:

$$\tilde{T}^\lambda \leftrightarrow \{\tilde{\tau}^\lambda\} \leftrightarrow \beta^\lambda \leftrightarrow \{\tilde{\chi}^\lambda, \tilde{\varphi}^\lambda, \tilde{\chi}^\lambda, \tilde{\psi}^\lambda, \tilde{\eta}^\lambda\}$$

$$\tilde{\chi}^\lambda \leftrightarrow \{-\tilde{\chi}, {}^0\tilde{\chi}, +\tilde{\chi}\}^\lambda \leftrightarrow \leftrightarrow \{\{\tilde{\lambda}, \tilde{\varphi}, \tilde{\chi}, \tilde{\psi}, \tilde{\eta}\}^\lambda, \tilde{\varphi}^\lambda, \{\tilde{\eta}, \tilde{\psi}, \tilde{\chi}, \tilde{\varphi}, \tilde{\lambda}\}^\lambda\}$$

$$\tilde{\varphi}^\lambda \leftrightarrow {}^0\tilde{\lambda}^\lambda \leftrightarrow \{-\tilde{\varphi}, {}^0\tilde{\varphi}, +\tilde{\varphi}\}^\lambda \leftrightarrow \leftrightarrow \{\{\tilde{\varphi}, \tilde{\chi}, \tilde{\psi}, \tilde{\eta}\}^\lambda, \tilde{\varphi}^\lambda, \{\tilde{\eta}, \tilde{\psi}, \tilde{\chi}, \tilde{\varphi}\}^\lambda\}$$

$$\tilde{\chi}^\lambda \leftrightarrow {}^0\tilde{\varphi}^\lambda \leftrightarrow \{-\tilde{\chi}, {}^0\tilde{\chi}, +\tilde{\chi}\}^\lambda \leftrightarrow \leftrightarrow \{\{\tilde{\chi}, \tilde{\psi}, \tilde{\eta}\}^\lambda, \tilde{\varphi}^\lambda, \{\tilde{\eta}, \tilde{\psi}, \tilde{\chi}\}^\lambda\}$$

the other details of  $\tilde{T}^\lambda$  are defined in line with this:

$$\{\tilde{\lambda}, \tilde{\varphi}, \tilde{\chi}, \tilde{\psi}, \tilde{\eta}\}^\lambda \leftrightarrow \{-\tilde{\lambda}, -\tilde{\varphi}, -\tilde{\chi}, -\tilde{\psi}, -\tilde{\eta}\}^\lambda, \{\tilde{\eta}, \tilde{\psi}, \tilde{\chi}, \tilde{\varphi}, \tilde{\lambda}\}^\lambda \leftrightarrow \{+\tilde{\eta}, +\tilde{\psi}, +\tilde{\chi}, +\tilde{\varphi}, +\tilde{\lambda}\}^\lambda.$$

The diagram  $\{\tilde{T}^{\beta\lambda}\}$  (Fig.2) describes the connections of fields  $\tilde{T}^{\beta\lambda}$ .

Fig.3 gives an idea of construction of original unit  $\Lambda^\lambda$  with ordinary one  ${}_\omega\gamma^{\lambda \leftrightarrow \lambda} \leftrightarrow \tilde{\Lambda}^\lambda$ , which connects  $\Lambda^\lambda$  with all discrete units of level  $\lambda$  without the breaks.  $\tilde{\Lambda}^\lambda$  arises in  $\Lambda^\lambda$  outlook of the level space. Fig.4 describes the activity of  $\Lambda^\lambda$ , when discrete levels are connected without the breaks too. The outlooks in the level space turns into the units of higher times in this activity.

In agreement with  $\{\tilde{T}^{\beta\lambda}\}$ , the connections of number characteristics in  $\Lambda^\lambda$  are connected:

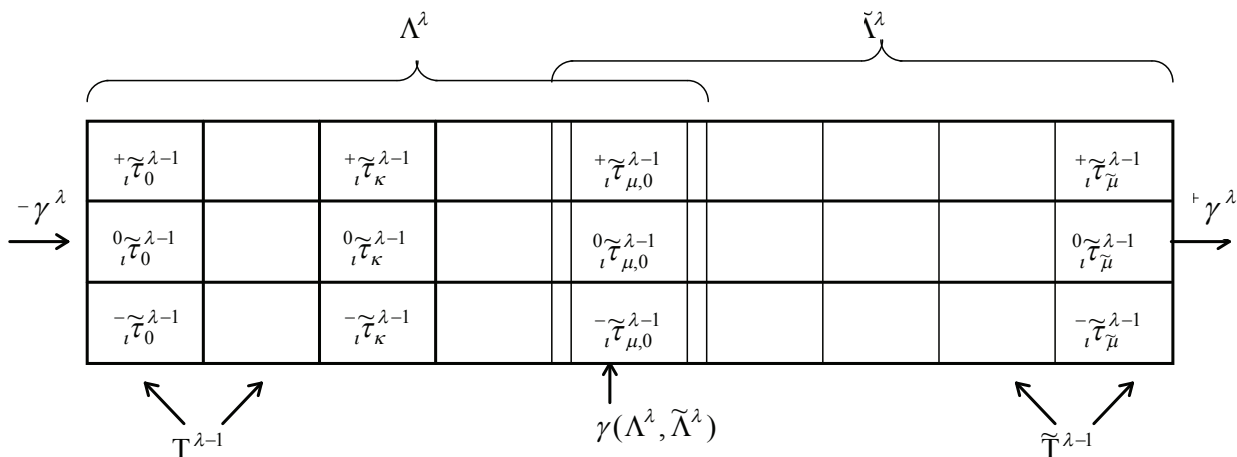


Fig.3 The construction which unite the original unit  $\Lambda^\lambda$  with its ordinary unit  $\tilde{\Lambda}^\lambda$  created by the original multiplying act; lower level units have diverse states in the field  $\{\Lambda^\lambda, \tilde{\Lambda}^\lambda\}$ : neutral  ${}^0\tilde{\tau}$  and opposite directed:  $+\tilde{\tau}$  and  $-\tilde{\tau}$

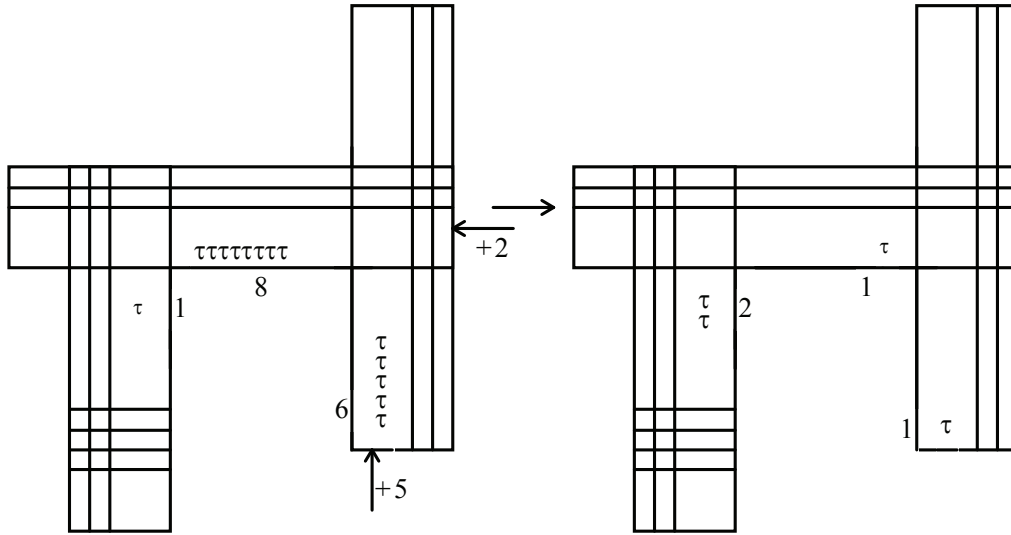


Fig.4 The uniting act in  $\Lambda^\lambda : 186+25=211$

$$\begin{matrix} \lambda^\lambda & \tilde{\varphi}^\lambda & \tilde{\chi}^\lambda & \tilde{\psi}^\lambda \\ \updownarrow & \updownarrow & \updownarrow & \updownarrow \\ 1^\lambda & \leftrightarrow 0.1^\lambda + 1 & \leftrightarrow 0.01^\lambda + 2 & \leftrightarrow 0.001^\lambda + 3 \\ \updownarrow & & & \\ \omega^\lambda & & & \end{matrix}$$

$1^\lambda$  - is the unit of level  $\lambda$ . Diverse levels have their own bases ( $\mu^{\lambda-1}, \mu^\lambda, \mu^{\lambda+1}, \mu^{\lambda+2}, \mu^{\lambda+3}$ ) which are (not obligatory equal)  $\mu^\lambda \leftrightarrow 10^\lambda$ .

The unit  $\Lambda^\lambda$  (Fig 3) works in the following way. At first  $\{\Lambda^\lambda, \tilde{\Lambda}^\lambda\}$  contains the neutral lower units and gets on the input  $-\gamma^\lambda$  the lower units of diverse directions (signs); the uniting of opposite oriented units gives the neutral unit again. If an amount of identical directed units mounts to  $\mu^\lambda$  then  $\Lambda^\lambda$  sends to the level  $(\lambda + 1)$  the unit of level  $(\lambda + 1)$  and changes its own state from  $\tilde{\varphi}^\lambda$  in  $\tilde{\lambda}^\lambda$ . In this state every unit  $\Lambda_t^\lambda$  gives its ordinary one  $\tilde{\Lambda}^\lambda$  to the unit  $\Lambda_{t+1}^\lambda$  and then inputs of level  $\lambda$  go to  $\Lambda_{t+1}^\lambda$ . In this way the uniting act leads to the original multiplying, when the new unit of its level arises in the level space.

State changing in the space  ${}^B\Lambda$  is the task of the coordinator  $A^\lambda$  of unit  $\Lambda^\lambda$ ; this task is carried out by the uniting and multiplying acts. The next tables on the contractions of  $\tilde{T}^\lambda$  connects  $\Lambda^\lambda$  with algebra systems.

The multiplication of real numbers is described by the tables of state changing function  $R^*$  of  $\Lambda_0^\lambda \leftrightarrow \Lambda^\beta$  on the  ${}_R\tilde{T}^\lambda$  :

Table  $R^*$ .

$\chi^\ell \backslash C^\ell$	$-\lambda$	$\varphi$	$+\lambda$
$-\lambda$	$+\lambda$	$\varphi$	$-\lambda$
$\varphi$	$\varphi$	$\varphi$	$\varphi$
$+\lambda$	$-\lambda$	$\varphi$	$+\lambda$

$${}_R\tilde{T}^\lambda \leftrightarrow \{-\lambda, \tilde{\varphi}^+\lambda\} \& \tilde{\varphi}^\lambda \leftrightarrow 0^\lambda \& \pm \tilde{\lambda}^\lambda \leftrightarrow 1^\lambda.$$

The multiplication of complex numbers is described by the table  $C^*$  on  ${}_c\tilde{T}^\lambda$

Table  $C^*$ .

$\chi^\ell \backslash C^\ell$	$-\lambda$	$-\varphi$	$\chi$	$+\varphi$	$+\lambda$
$-\lambda$	$+\lambda$	$+\varphi$	$\chi$	$-\varphi$	$-\lambda$
$-\varphi$	$+\varphi$	$-\lambda$	$\chi$	$+\lambda$	$-\varphi$
$\chi$	$\chi$	$\chi$	$\chi$	$\chi$	$\chi$
$+\varphi$	$-\varphi$	$+\lambda$	$\chi$	$-\lambda$	$+\varphi$
$+\lambda$	$-\lambda$	$-\varphi$	$\chi$	$+\varphi$	$+\lambda$

$${}_c\tilde{T}^\lambda \leftrightarrow \{-\tilde{\lambda}, -\tilde{\varphi}, \chi, +\tilde{\varphi}, +\tilde{\lambda}\}^\lambda \& \\ \pm \text{Re}(\omega^\lambda) = \pm \tilde{\lambda}^\lambda \& \pm \text{Im}(\omega^\lambda) = \pm \tilde{\varphi}^\lambda \& \\ \tilde{\chi}^\lambda \leftrightarrow 0^\lambda \& \omega^\lambda \in C^\lambda.$$

The table  $Z^*$  of quaternion multiplication and the

Table  $Z^*$

$X^l \backslash C^l$	?	$+\psi$	$+\chi$	$+\varphi$	$+\lambda$
?	?	?	?	?	?
$+\psi$	?	$-\lambda$	$-\varphi$	$+\chi$	$+\psi$
$+\chi$	?	$+\varphi$	$-\lambda$	$-\psi$	$+\chi$
$+\varphi$	?	$-\chi$	$+\psi$	$-\lambda$	$+\varphi$
$+\lambda$	?	$+\psi$	$+\chi$	$+\varphi$	$+\lambda$

diagram of this table (Fig.5) are defined on  $Z^{\tilde{T}^\lambda}$ :

$$Z^{\tilde{T}^\lambda} \leftrightarrow \{-\tilde{\lambda}, -\tilde{\varphi}, -\tilde{\chi}, -\tilde{\psi}, \tilde{?}, +\tilde{\psi}, +\tilde{\varphi}, +\tilde{\lambda}\}^\lambda$$

$\tilde{?}^\lambda \leftrightarrow 0^\lambda, \pm\tilde{\lambda}^\lambda$  - real coordinate,  $\pm\tilde{\varphi}^\lambda, \pm\tilde{\chi}^\lambda, \pm\tilde{\psi}^\lambda$  - imaginary coordinates.

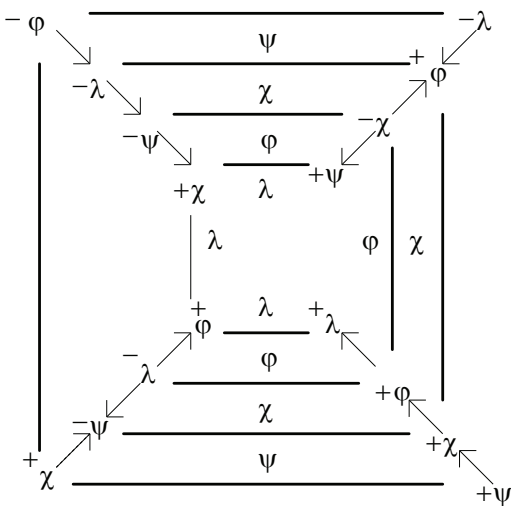


Fig.5 The diagram of quaternions multiplication

All tables are formed from  $\{\tilde{T}^\lambda\}$  by the following way:

the index  $i_c \in \beta \Lambda$  of diverse states is the sign of  $i_c \tilde{\tau}^\lambda$  in the initial state of space  $\tilde{T}^\lambda$ : in this state  ${}_\lambda \tilde{\tau}^\lambda$  is a center of coordinates;

the index  $i_x \in \beta \Lambda$  of inputs units (coordinating signals) is the sign of level  $i_x$ ;  $i_x$  becomes new center of coordinates;

the changing of index in the new space of coordinates cannot repeat the results of the others lines in the tables.

In this way algebra systems and automats are defined by the means of  $\Lambda^\lambda$ , but adverse act is impracticable because of  $\Lambda^\lambda$  is the hierarchic multilevel unit with interlevel connections. The

identification of number code with polynomial one is the most hard and widespread error of set theory based mathematics. The point is that the uniting of numbers in  $\Lambda^\lambda$  leads to the event, when the power of result exceeds the powers of addenda (the new level unit arises), but in the polynomial group (and in algebra in general) this event is forbidden. The named error is one of the main reasons of existent arithmetics systems incoherence with each other and with the laws of real level space. The similar errors arise because of the absence of number code theory. The practical significance of this theory creation was grounded by H. Lebesque.

The images of integer, real, complex, hypercomplex numbers are described above by the strata of the outlook in the level space  $(\lambda, \varphi, \chi, \psi)$  of the numbers might (coordinator of the number space). It is cohered with the history of numbers creating. The real numbers were created in the uncertain field of the results of the acts with the integer numbers. The complex numbers arose when the results of the acts with real numbers were founded beyond the boundaries of real numbers. The arising of the every new strata of the number space changed all before created strata: the numbers images acquired new signs in their constructions.

Geometry system  $\Gamma^\lambda$  is hierarchic unit  $\Lambda^\lambda$  too and it has its own construction  $\sigma^{\lambda-\tau}$ , the aggregated image  $\omega^\lambda$  and the environment  $\sigma^{\lambda+\tau}$  (other units beyond the boundaries  ${}_\omega \gamma^\lambda$  of  $\Gamma^\lambda$ ); for measuring of  $\Gamma^\lambda$  the metrical characteristic  $\mu^\lambda$  is used.

The connections  ${}_\omega \gamma^\lambda$  of  $\omega^\lambda$  with other units are its coordinates in  $\sigma^{\lambda+\tau}$ . The constructions have two basic characteristics:  $\xi^{\lambda+\tau}$  (connection break) and  $\delta^{\lambda+\tau}$  (constructive dimension);  $\mu^\lambda$ ,  $\delta^{\lambda+\tau}$  and  $\delta^{\lambda-\tau}$  are connected and described in number code of  $\Lambda^\lambda$  arithmetics.

Metrical characteristic  $\mu^\lambda \in M^\lambda$  is constructed from the units  ${}_\tau \eta^\lambda \in H^\lambda \leftrightarrow \{\psi \eta^\lambda, \chi \eta^\lambda, \varphi \eta^\lambda, \lambda \eta^\lambda\}$  with coefficients from  $\Lambda^\lambda$ :

$${}_\tau \tilde{\mu}^\lambda \leftrightarrow {}_\tau (-\tilde{\mu}^\lambda, {}^0 \tilde{\mu}^\lambda, +\tilde{\mu}^\lambda),$$

$${}^0 \tilde{\mu}^\lambda \leftrightarrow {}_\tau ({}^{-0} \tilde{\mu}^\lambda, {}^{00} \tilde{\mu}^\lambda, {}^{+0} \tilde{\mu}^\lambda) \leftrightarrow {}_\tau \tilde{\mu}^{\lambda-1},$$

where  $\tau \in \Lambda$ ,  $-\tilde{\mu}^\lambda$  -the negative,  ${}^0 \tilde{\mu}^\lambda$  -neutral,  $+\tilde{\mu}^\lambda$  -positive details of  $\tilde{\mu}^\lambda$ ;  ${}^0 \tilde{\mu}^\lambda$  is a unit of level  $\lambda - 1$  and so on.



The numeric characteristic of  $\sigma^\lambda$  - the connection break  $\tilde{\xi}$  and constructive dimension  $\tilde{\delta}$  - are constructed below.

Let the field  $\Xi^\lambda$  and the act  $\xi\rho: \sigma^\lambda \gamma^\lambda \rightarrow \Xi^\lambda$ , are defined as :

$$\Xi^\lambda \leftrightarrow \{\xi_\sigma^\lambda \leftrightarrow (\xi, \nu)_\sigma^\lambda, (\xi, \nu)_\sigma^\lambda \in \Lambda \times \mathbb{N} \& \xi \in \Lambda \& \nu \in \mathbb{N} \& \mathbb{N} \leftrightarrow \mathbb{N}^+ \cup \{0\}\}$$

$$[\xi\rho(\sigma^\lambda \gamma^\lambda) \leftrightarrow (\xi, \nu)_\sigma^\lambda, \xi \leftrightarrow \lambda - \tilde{\lambda}] \Leftrightarrow$$

$$\Leftrightarrow [(\exists \bar{\omega}^\lambda \subset \sigma^\lambda)(\omega \gamma(\bar{\omega}^\lambda) \leftrightarrow \omega \gamma^\lambda \& \omega \gamma^\lambda \subset \sigma^\lambda \gamma^\lambda \& \omega \gamma^\lambda \leftrightarrow \omega \gamma_i^\lambda: \omega \gamma_i^\lambda \leftrightarrow \omega \gamma(\omega_i^\lambda) \& \lambda \rho(\omega \gamma_i^\lambda) \leftrightarrow \tilde{\lambda} \& \eta \rho(\omega \gamma_i^\lambda) \leftrightarrow \nu_i^\lambda)],$$

$$\lambda \rho(\omega \gamma_i^\lambda) \leftrightarrow \Lambda, \nu \rho(\omega \gamma_i^\lambda) \leftrightarrow \mathbb{N}, \text{ and } \nu - \text{cardinality of } \omega \gamma^\lambda, \omega \gamma_i^\lambda - \text{the interactions of } \omega_i^\lambda \text{ in } \sigma^\lambda; \mathbb{N}^+ - \text{the natural numbers space, } \Lambda \in \Lambda^\lambda.$$

Then  $\xi_\sigma^\lambda$  is connection break of  $\sigma^\lambda$  with  $\xi$  (degree) and  $\nu$  (cardinality).

For 3-D space:

$$(\forall \lambda \in \Lambda) \Rightarrow (\xi_\sigma \in I_\xi, I_\xi \leftrightarrow \{0,1,2,3\}).$$

The locations of connections breaks in  $\sigma^\lambda$  are defined by  $\xi_{\sigma,\gamma}^\lambda$  :

$$\xi_{\sigma,\gamma}^\lambda \leftrightarrow (t, \tau)_{\xi \dots} (t, \tau)_0 :$$

$$(\forall \xi^\lambda \geq 0) \Rightarrow [(t, \tau)_\xi \leftrightarrow \{(t, \tau): (t, \tau) \in I^\lambda \times I^\lambda \& \tau \neq t \&$$

$$\omega \rho(\gamma_{t,\tau}^\lambda) \leftrightarrow \lambda - \tilde{\lambda} \leftrightarrow \xi^\lambda \}].$$

For each unit  $\omega^\lambda$  of level  $\lambda \in \Lambda$ , connection break  $\xi_\omega^\lambda$  in  $\omega^\lambda$  is the contraction of connection break  $\xi_{\sigma,\gamma}^{\lambda+1}$  of  $\omega^{\lambda+1}$  unit with  $\omega \gamma^\lambda$ . In number code the connection break is defined as:

$$\tilde{\xi}^\lambda \leftrightarrow (\nu_3 \dots \nu_0)_\xi, \tilde{\xi}^\lambda \in \{\xi_\sigma^\lambda, \xi_\omega^\lambda\}.$$

The constructive dimension  $\delta^\lambda \in \Lambda^\lambda$  of the unit  $\omega^\lambda$  is the number characteristic of  $\omega^\lambda$  described in  $\Lambda^\lambda$  code:

$$\tilde{\delta}^\lambda \leftrightarrow (\nu_3, \dots, \nu_0)_\delta, \tilde{\delta}^\lambda \in \{\delta_\sigma^\lambda, \delta_\omega^\lambda\} (\nu_i)_\sigma \leftrightarrow (\nu_{3-i})_\xi,$$

where  $(\nu_i)_\sigma \in \mathbb{N}, i \leftrightarrow 0,1,2,3; \delta_\sigma^\lambda$  and  $\delta_\omega^\lambda$  - constructive dimensions of  $\omega^\lambda$  and  $\sigma^\lambda$ .

Notice that Euclid, Lebeg-Brauer, Uryson, fractal and parametric dimensions comes out as the

details of constructive dimension  $\sigma^\lambda$ , and known graph classes could be defined with the help of  $\xi^\lambda$ .

$\Lambda^\lambda$  may be regarded as new coordinate space (hierarchic coordinates) which has not only habitual transformations of coordinates, but also dimension changes (in line with interlevel connections of real, complex and hypercomplex numbers).

The records of  $\tilde{\xi}^\lambda$  and  $\tilde{\delta}^\lambda$  in  $\Lambda^\lambda$  code allow to carry out all  $\Lambda^\lambda$  tasks with  $\tilde{\xi}^\lambda$  and  $\tilde{\delta}^\lambda$  and one may to change the units dimensions and connections with the changing of their scales in  $\tilde{\Gamma}^\lambda$ . The acts with  $\xi_{\sigma,\gamma}^\lambda$  and  $\delta_{\sigma,\gamma}^\lambda$  are executed in the space of  $\Lambda^\lambda$  laws.

All geometric characteristics in hierarchical space are changeable. The changes of construction connections in  $\sigma^{\lambda-\tau}$  (changes in  $\xi^{\lambda-\tau}$  and  $\delta^{\lambda-\tau}$ ) cause the alteration of coordinates  $\omega^\lambda$  (the movements of  $\Gamma^\lambda$  in  $\sigma^\lambda$ ) and thereby the changes in the construction  $\sigma^{\lambda+1}$ . Thanks to that the aed processor discovers the new horizons in the constructing of changeable graphic images of all real systems - physical, chemical, biological, technical and others.

Above made defining of known mathematical constructions in standard (changeable) code of aed statute turn them into strongly connected details of the new mathematics which meet all requirements of sway (design, control and learning) tasks. These details acquire in the new code wider abilities than earlier ones. Besides they are now more convenient as the base of new processors creating.

## CONCLUSION

Number codes, graphics, dynamic and twolevel systems (defined above in code of aed statute) belong to the key range in hierarchical time&space. Their study with new mechanism of mathematics&cybernetics discovers their new abilities. And increases their practical significance in the coordinations of large scale systems.

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**НАТУРАЛЬНЫЯ ГРАМАТЫКІ Ў НОВЫМ СВЕЦЕ:  
ІХ ВЫМЯРЭННІ, СУВЯЗІ І ПРАКТЫЧНЫ ЎДЗЕЛ У РУХУ ДУМКІ,  
УДАСКАНАЛЕННІ АБМЕНУ ВЕДАМІ, ВЫЛІЧАЛЬНАЙ ТЭХНІКІ  
І НАЦЫЯНАЛЬНАЙ ПАЛІТЫКІ**

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Згодна з вынікамі тэорыі іерархічных многаўзроўневых сістэм (Novikava et al., 1998), свет утрымлівае кіруемыя страты (гісторыю захаваную ў яго змесце), пануючыя (колы ўлады) і новыя — мэту свету.

Да кіруемых страт належаць узроўні прыроды (фізічны, хімічны, біялагічны) і дэмаграфічны ўзровень (у яго склад уключаны асобы і сем'і). Колы ўлады (узровень ведаў) складаюцца з вытворчасці (уласна вытворчасць і сродкі яе ўладкавання — транспарт, гандаль, сервіс, фінансавыя сістэмы) і творчасці — мова, мастацтва, навука, асвета і канструяванне новых сістэм (інавацыі). Да ўзроўня ведаў належаць улада дзяржаў (заканадаўчая, выканаўчая і судовая) і наддзяржаўных уладжанняў — ААН, ЕС, СНД, Ісламская канферэнцыя, і інш.

З цягам часу ўсё больш значная частка дзейнасці інстытутаў дзяржаўнай і наддзяржаўнай улады апынаецца ў так званай электроннай прасторы — у полі высокіх тэхналогій. Узорамі гэтай дзейнасці з'яўляюцца адпаведныя дзяржаўныя і наддзяржаўныя сеткі (у Еўрапейскім Саюзе — ICIMS-NOE (каардынатар P.Groumpos), у ЗША — Governmental Network (навуковы кіраўнік F.Kile)). Зараз абмяркоўваецца і магчымасць стварэння адпаведнай сеткі ААН (рабочая назва — Sway Network) (Frederick O.Kile et al., 1998).

Адна з найбольш цяжкіх задач у стварэнні такіх сетак (у тым ліку і сетак асобных дзяржаў, дзе можа быць некалькі моў і дзе неабходна абслугоўваць сувязі з навакольным светам — з іншымі дзяржавамі і многімі мовамі) — гэта задача абмену ведамі розных моў.

Вядомыя сродкі машыннага перакладу не даюць магчымасці прымаць аўтаматызаваць такія абмен, як і вядомыя мовы праграмавання не дазваляюць паспяхова рашаць асноўныя задачы ўзроўня ведаў (задачи ўлады) — аўтаматызацыю працэсаў канструявання новых сістэм і асветы. Задачи ўлады (кібернетыкі) ў вядомых вылічальных тэхналогіях нават не могуць мець дакладнага азначэння, асабліва задачы аўтаматызацыі інавацыйных працэсаў і ўзаемадзеяння натуральных моў.

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Таму вялікая ўвага ў праектах ЕС і ЗША ўдзяляецца зараз практычнаму здзяйсненню прапаноў тэорыі іерархічных многаўзроўневых сістэм.

Гэта тэорыя дакладна азначае задачы кібернетыкі і адпаведныя ім сеткі ўлады (Frederick O.Kile et al.; 1998, Buka, 1997; Novikava et al., 1995a), прапануе новыя канструкцыі вылічальных сістэм (Novikava et al., 1995b)); дакладныя матэматычныя выразы вядомых граматык натуральных моў і схемы ўладкавання іх узаемадзеянняў.

У згаданых выразях усякая натуральная мова дзеліцца на поле канкрэтных ведаў і ключавыя сказы (сістэмы ўлады ведаў) — граматычныя канструкцыі, здольныя ўладкоўваць канкрэтныя (знамянальныя) часткі тэкстаў згодна з мэтамі гэтых сказаў. Ключавыя сказы, чый лад змяняецца ад загадкавага (пытальнага) да абвеснага і загаднага, адпавядаюць руху думкі ў працэсе ўдакладнення ведаў, і ўсе існуючыя зараз натуральныя граматыкі ўдаецца размеркаваць у іерархічных каардынатах па характары ключавых сказаў і па метадах іх узаемадзеяння з канкрэтнымі ведамі. Усе граматыкі ў такім размеркаванні аказваюцца рознымі станамі аднаго сімвальнага кода (матэматыкі) здольнага звязаць іх і кіраваць зменай станаў і рухам абмену зместам ведаў.

У дакладзе ўзгаданыя вядомыя вынікі — азначэнне розных кірункаў канкрэтных ведаў (фізічных, хімічных, біялагічных, дэмаграфічных, вытворчых і творчых) і сетак улады дзяржаў і іх звязаў, а ў якасці іх працягу прапанаваны новыя — матэматычнае азначэнне граматык натуральных моў і схема іх размеркавання (стратыфікацыі) ў іерархічных каардынатах. Прыведзеныя ўзоры схем беларускай і англійскай моў маюць практычнае значэнне не толькі ў полі дзеяння вылічальнай тэхнікі (як асновы лінгвістычных працэсараў), але і ў звычайнай асвеце — такія схемы дазваляюць адразу ўсведамляць граматыку адпаведнай мовы і пасля гэтага навучанне працягваецца ўзбагачэннем лексікі.

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# HIERARCHICAL SYSTEM OF NATURAL GRAMMARS AND PROCESS OF INNOVATIONS EXCHANGE IN POLYLINGUAL FIELDS<sup>1</sup>

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**Abstract:** Natural grammars with ways of mind activity in cybernetics (design&learning, innovating) technologies are defined in the paper by mathematical symbol (image, scheme) of hierarchical systems. Suggested hierarchical scheme of the whole field of natural grammars connects mathematical images of individual grammars as certain stages of process in hazy zones when new strata arise. Own arrangement of the images and their order in their general scheme correspond to marked lines of grammars in mind activity, and thereby - to ways of text organizing by their means. The scheme meets all requirements of practical cybernetics, it brings new light in theory & practice of connecting nations, allows to simplify innovating technologies and their exchange in polylingual fields.

**Keywords:** hierarchical systems, innovating technologies, polylingual fields, natural grammars

## 1. THE TASK

Mind activity (thinking process) in innovating technologies finds its reflection in symbol systems - mathematics, graphical images processing and others. Among them are natural grammars, grammars of natural languages. They allow to organize the changes of vague texts like to thinking process with hazy thoughts (active images of systems). In this process the new questions are asked beyond old horizons of thoughts, then they are turned into certain answers or orders, and the orders may lead to many questions again. Together with turns of questions into answers and back, the symbols of units (nouns), acts (verbs), signs (adjectives, attributes) and other members of text may be turned one into another - similar to the facts of practice and unlike many theories where they can not be converted.

However, the turns of hazy zones of mind into good arranged systems and back don't have an exact definition in natural grammars. (Since that the innovating technologies in one national mind are hidden for other minds, and an exchange by their individual merits and advantages in the field of one grammar is very limited.) Moreover the means of natural grammars are too weak in order to define innovating activity, natural grammars, their links, and the whole field of national languages.

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Mathematical image of hierarchical systems (Novikava et al., 1998) originated by works of M. Mesarovic and Y. Takahara (Mesarovich et al., 1970; Mesarovich and Takahara, 1975) allows it to be done. In agreement with this task the paper contains mathematical scheme of hierarchical systems cohered with cybernetic technologies (innovating processes) and images of natural grammars connected in their hierarchical field.

## 2. MATHEMATICAL SYMBOL OF HIERARCHICAL SYSTEMS

Mathematical symbol  $A^\lambda$  of hierarchical systems has now two main images –  ${}^{\times}\alpha^\lambda$  and  ${}^{+}\alpha^\lambda$  (Fig. 1).  ${}^{\times}\alpha^\lambda$  and  ${}^{+}\alpha^\lambda$  define one statute of hierarchical systems with law and mechanism of level increasing.

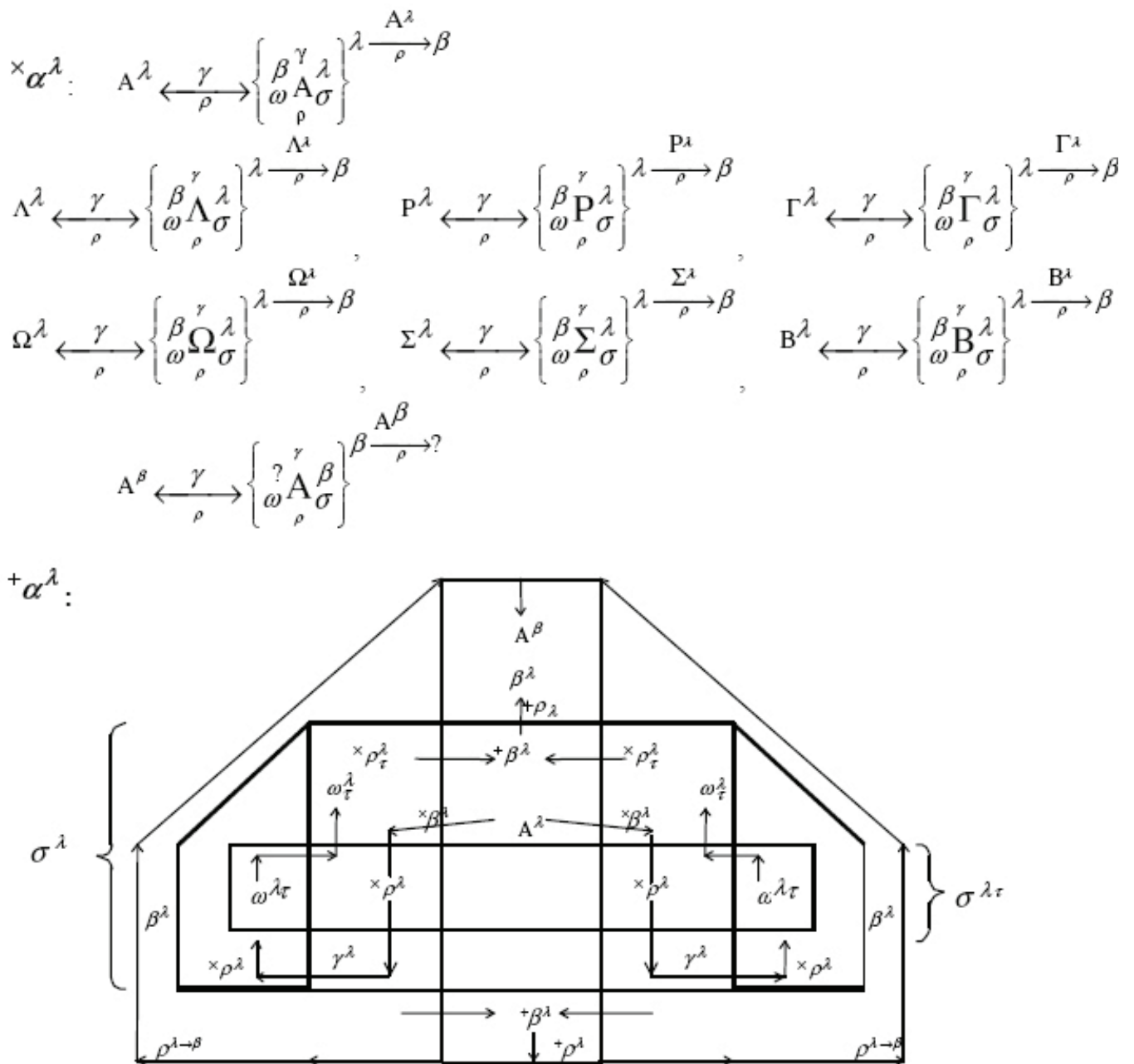


Fig. 1 Mathematical images  ${}^{\times}\alpha^\lambda$  and  ${}^{+}\alpha^\lambda$  of hierarchical systems.

In agreement with the statute in Fig. 1 the system  $A^\lambda$  (initial authority, origin of level  $\lambda$ ) turns level  $\lambda$  into higher level  $\beta$ , or time  $\lambda$  into new times  $\beta$ . Time  $\lambda$  includes history of  $A^\lambda$  arising (natural history of  $A^\lambda$ , lower levels  $\lambda_\tau$ );  $\lambda$  is own history of  $A^\lambda$  ( $\lambda \leftrightarrow \{\times\lambda, +\lambda\}$ ,  $\times\lambda$  – time of  $A^\lambda$  multiplying,  $+\lambda$  – time of many new systems uniting);  $\beta$  will be the time of  $A^\lambda$  renovating (its changing by new (higher) levels);  $\beta$  is hazy zone in  $A^\lambda$  (its aim, task); in  $A^\beta$  (system of new time  $\beta$ ) sign  $\beta$  looks as  $\infty$  since aim of  $A^\beta$  is dark haze in  $A^\lambda$ ,  $A^\beta$  will have its own tasks and strategies.

$A^\lambda$  in multiplying act ( $\times\rho^\lambda : \omega_0^\lambda \rightarrow \sigma^\lambda, \omega_0^\lambda \leftrightarrow A^\lambda$ ) is included into its contents ( $\sigma^{\lambda\tau}$  – field of  $A^\lambda$  arising in earlier times  $\lambda_\tau$ ), and then into its own strata  $\{\lambda, \rho, \gamma, \omega, \sigma, \beta, \alpha\}^\lambda \leftrightarrow \sigma^{\lambda\tau} \leftrightarrow \{\omega_\tau^\lambda\}$ .

Thanks to that singular system  $A^\lambda$  is turned into many systems – plural number  $\sigma^{\lambda\tau}$  of things  $\{\omega_\tau^\lambda\}$  of level  $\lambda$ , its ordinary units  $\{\Lambda^\lambda, P^\lambda, \Gamma^\lambda, \Sigma^\lambda, B^\lambda\} \leftrightarrow \omega_\tau^\lambda \leftrightarrow \sigma^\lambda$ . They have old abilities of  $A^\lambda$  and new ones. Being the heirs of  $A^\lambda$ , systems  $\{\omega_\tau^\lambda\}$  are organized by its initial order  $\gamma_o^\lambda$ , and they have their own directions and mechanisms  $\{\Lambda, P, \Gamma, \Omega, \Sigma, B\} \leftrightarrow \{\tau_\tau^\lambda\}$  of level increasing, and their own vague zones  $\{\lambda\beta^\lambda, \rho\beta^\lambda, \gamma\beta^\lambda, \omega\beta^\lambda, \sigma\beta^\lambda, \beta\beta^\lambda\}$  – areas of their own will, hazy horizons where initial might of their origin is increased.

Systems  $\{\omega_\tau^\lambda\}$  at first are odd units with chaotic activities  $\{\rho_\tau^\lambda\}$ , vague links  $\{\omega_\tau^\lambda\} \leftrightarrow \{\gamma_\tau^\lambda\}$ , chimerical statute  $\gamma_\sigma^\lambda \leftrightarrow \gamma_\tau^\lambda$  (sign  $?$ , as well as  $\infty$ , means haze, vagueness, chaos).

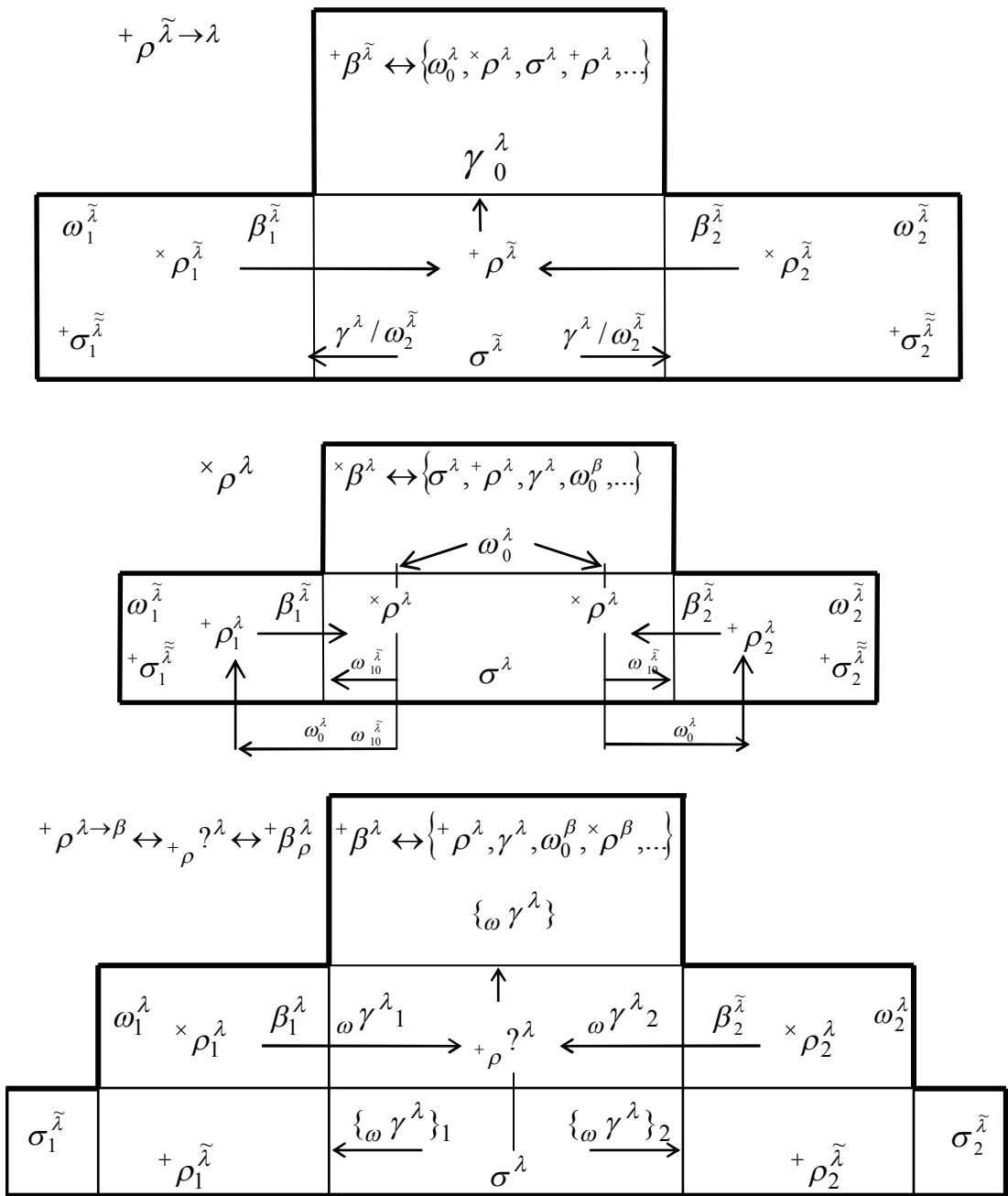
In this way the original order  $\gamma_o^\lambda$  of initial unit  $\omega_o^\lambda$  is turned into haze  $\{\gamma_\tau^\lambda\} \leftrightarrow \gamma_\sigma^\lambda$ , and level of this haze is higher than one of old order – numbers  $\tau^\lambda$  of units  $\{\omega_\tau^\lambda\}$  are more than 0, these numbers belong to zone  $\times\lambda$  which includes  $\lambda_o$  (level of origin  $\omega_o^\lambda$ ), that is any  $\tau^\lambda$  includes  $\lambda_o$ . Systems  $\{\omega_\tau^\lambda\}$  continue acts  $\{\rho_\tau^\lambda\}$  (natural history of  $\omega_o^\lambda$ , its time of arising) in their contents  $\{\sigma_\tau^\lambda\}$ . Hence, times  $\lambda_\tau$  are continued in each of them, and these multiplied times  $\{\lambda_\tau\}$  look as things  $\{\omega_\tau^\lambda\}$  in time  $\lambda$ . Act  $\times\rho^\lambda \leftrightarrow \times\rho_0^\lambda$  of original authority  $\omega_o^\lambda$  multiplying is turned into many acts  $\{\times\rho_\tau^\lambda\}$  – activities of units  $\{\omega_\tau^\lambda\}$  directed to their environment  $\sigma^\lambda$  (fields of new level arising).

Owing to many acts  $\{\times\rho_\tau^\lambda\}$  the general uniting process  $+\rho^{\lambda \rightarrow \beta}$  ( $+\rho^{\lambda \rightarrow \beta} : \sigma^\lambda \rightarrow \omega_{10}^\lambda \rightarrow \omega_0^\beta \leftrightarrow A^\beta$ ) begins in  $\sigma^\lambda$ . Act  $+\rho^\lambda$  defines new dimension, it is directed to statutes  $\gamma_\sigma^\lambda$  (of the field  $\sigma^\lambda$ ),  $\omega_{10}^\lambda$  (of leading unit  $\omega_{10}^\lambda$  of time  $\lambda$ ),  $\gamma_0^\beta$  (of original system  $\omega_0^\beta$ , original authority of time  $\beta$ ). Sign  $10^\lambda$  is number of final authority of level  $\lambda$  and  $10^\lambda$  is turned into  $0^\beta$ ;  $10^\lambda$  may be any number, it remains hazy until  $\omega_0^\beta$  begins its multiplying  $\times\rho^\beta$  (if this law will be acting in time  $\beta$ ).

In this way  $+\rho^\lambda$  (uniting act) turns chaos  $\omega_\tau^\lambda$  into new order  $\gamma_0^\beta$  at time  $\beta$  – into system  $A^\beta$  with its own haze  $\infty^\beta$ .

It is worth to mark that process  $\rho^\lambda \leftrightarrow \{^x \rho^\lambda, ^+ \rho^\lambda\}$  turns initial singular unit into (multiplying) act, this act – into plural number (set, chaos of many odd systems), then – into act of uniting, statute, authority (system of higher level which will arrange its contents by its attributes); and time is turned by  $\rho^\lambda$  into many times and things. That is all  $A^\lambda$  strata are strongly connected in the level increasing process, and they turn into each other. Graphical scheme of process  $\rho^\lambda$  are imaged by Fig. 2.

Acts  $^+ \rho^{\tilde{\lambda}}, ^x \rho^{\tilde{\lambda}}, ^+ \rho^{\tilde{\lambda}}$  of hierarchical arithmetic in Fig. 2 remind swaying scales: with chaos – to order – to vagueness of more high level – to new links and new haze ( $\tilde{\lambda} \leftrightarrow \lambda_\tau \rightarrow \lambda \rightarrow \beta \rightarrow \infty$ ).



**Fig.2.** Mathematical mechanism of hierarchical systems changing ( $\tilde{\lambda} \leftrightarrow \lambda_\tau$ ).



${}^+\rho^{\tilde{\lambda}}$ ) units  $\{\omega_{\tau}^{\tilde{\lambda}}\}$  (including  $\omega_1^{\tilde{\lambda}}, \omega_2^{\tilde{\lambda}}$ ) have all marks of hierarchical systems – contents  $\{\sigma_{\tau}^{\tilde{\lambda}}\}(\tilde{\lambda} \rightarrow \lambda)$ , aims  $\{\beta_{\tau}^{\tilde{\lambda}}\}$ , and other;  $\{\omega_{\tau}^{\tilde{\lambda}}\}$  are multiplied by their own acts  $\{\times\rho_{\tau}^{\tilde{\lambda}}\}$  in their field  $\sigma^{\tilde{\lambda}}$ ; they suggest  $\{\omega\gamma_{\tau}^{\tilde{\lambda}}\}$  for exchange; in this exchange their general uniting act  ${}^+\rho^{\tilde{\lambda}}$  is defined;  ${}^+\rho^{\tilde{\lambda}}$  must construct statute  $\gamma_0^{\lambda}$  of origin  $\omega_0^{\lambda}$  of level  $\lambda$  (in  $\sigma^{\tilde{\lambda}}$  the unit  $\omega_0^{\lambda}$  looks as  $\omega_{10}^{\tilde{\lambda}}$  – leading unit of levels  $\lambda_{\tau}$  (none of ordinary units  $\{\omega_{\tau}^{\tilde{\lambda}}\}$  may be equal to  $\omega_{10}^{\tilde{\lambda}}$ );  $\omega_0^{\lambda}$  in the still  ${}^+\rho^{\tilde{\lambda}}$  of Fig. 2 are vague (it belongs to hazy zone  ${}^+\rho^{\tilde{\lambda}} \leftrightarrow \{\omega_0^{\lambda}, \times\rho^{\lambda}, \dots\}$ ); since that all lower strata are organized by statute  $\gamma_0^{\lambda}$  – by its signals  $\{\gamma^{\lambda} / \omega_{\tau}^{\tilde{\lambda}}\}$ ; these signals attract distinguished systems  $\{\omega_{\tau}^{\tilde{\lambda}}\}$  to mainstream  $\gamma_0^{\lambda}$  of time  $\tilde{\lambda}$  and send the others wide of  $\gamma_0^{\lambda}$ ;

it is *hidden authority*, sway of statute  $\gamma_0^{\lambda}$  in field  $\sigma^{\lambda}$  of levels  $\lambda_{\tau}$  (final stage of design technology in times  $\lambda_{\tau}$ );

$\times\rho^{\lambda}$ ) final sway  $\omega_{10}^{\tilde{\lambda}}$  of times  $\lambda_{\tau}$  and original authority  $\omega_0^{\lambda}$  of time  $\lambda$  are acting, and their multiplying act  $\times\rho^{\lambda}$  begins; its origin  $\omega_0^{\lambda}$  is known and its aim  $\sigma^{\lambda}$  is hazy, it belongs to  $\times\beta^{\lambda} \leftrightarrow \{\sigma^{\lambda}, \times\rho^{\lambda}, \dots\}$ ,  $\times\rho^{\lambda} \leftrightarrow \times\rho^{\lambda}$ :

1) leading unit  $\omega_{10}^{\tilde{\lambda}}$  is connected with  $\{\omega_{\tau}^{\tilde{\lambda}}\}$  and links  $\{\omega_{10}^{\tilde{\lambda}}, \omega_{\tau}^{\tilde{\lambda}}\}$  acquire abilities of leading unit  $\omega_{10}^{\tilde{\lambda}}$  and own directions  $\{\omega_{\tau}^{\tilde{\lambda}}\}$  of their improving; system  $\omega_{10}^{\tilde{\lambda}}$  is not included in  $\{\omega_{\tau}^{\tilde{\lambda}}\}$ , it only holds them in its order;

it is *tutor authority* (teaching technology);

2) signals  $\omega_0^{\lambda}$  of new strata  $\lambda$  are able to penetrate all lower strata  $\{\lambda_{\tau}\}$  and to sway them within all their systems, in this number within the smallest of them (it is included in all lower strata as their earlier time);

it is *total authority* (learned technology); learned units  $\{\omega_{\tau}^{\tilde{\lambda}}\}$  may be turned into ordinary systems  $\{\omega_{\tau}^{\lambda}\}$  of higher level  $\lambda$ ;

${}^+\rho^{\lambda \rightarrow \beta}$ ) act is imaged in Fig. 2 by the still where it is hazy (belong to  ${}^+\beta^{\lambda} \leftrightarrow \{{}^+\rho^{\lambda}, \gamma_0^{\beta}, \dots\}$ ); units  $\{\omega_{\tau}^{\lambda}\}$  are known; their uniting act  ${}^+\rho^{\lambda} \leftrightarrow \rho^{\lambda}$  is vague;  $\{\omega_{\tau}^{\lambda}\}$  have odd contacts  $\{\omega\gamma_{\tau}^{\lambda}\}$  in their field  $\sigma^{\lambda}$ ; here their sway is a united set of many odd images  $\{\omega\gamma_{\tau}^{\lambda}\}$  with marks of their own level and lower levels (old strata, history, archives);

it is *chimerical authority* (initial stage of design technology  ${}^+\rho^{\lambda}$  at level  ${}^+\rho^{\lambda}$ ;  ${}^+\rho^{\lambda}$  must design new times  $\beta$ ).

The stills  $\{{}^+\rho^{\tilde{\lambda}}, \times\rho^{\lambda}, {}^+\rho^{\lambda}\}$  of level increasing process  $\rho^{\lambda}$  connect hierarchical mathematics  $A^{\lambda}$  with new tasks of cybernetics, i. e. design ( ${}^+\rho^{\lambda}$ ) and learning ( $\times\rho^{\lambda}$ ). It is for the first time when these tasks (innovating technologies) are defined as process able (together with certain knowledge constructing) to ascend new haze (ask new questions) whose level is higher than one of old order.

Initial task of cybernetics (control) acquires in schemes of Fig. 2 many new states: control (sway) systems change their states with chimerical authority (in deem haze) to hidden sway, tutor and total ones. All these states have their own aims and strategies of their activities. The strategies correspond to  $A^\lambda$  strata which prove to be sway systems in certain stages of level increasing process.

Similar facts (stages of level increasing process) are in  $A^\lambda$  history  $\lambda_\tau$  which includes physical, chemical, biological, demographical, and knowledge levels authorized by mathematics. In the light of  $A^\lambda$  they have exact connected definitions (Fig. 3), where their times prove to be strata of the whole hierarchical system.

Simple scheme of numbers history in mathematics allows to see  $A^\lambda$  might as authority (sway) of symbol systems. This history connects following stages:

- natural numbers (origin of arithmetic and all mathematical figures) are offered within  $I$  – in order to define positive fractions less than  $I$  (members of  $I$ , its contents); then the acts with positive real numbers and their links with natural ones are defined;
- all positive real numbers are included into  $\theta$  to define negative real ones (less than  $\theta$ ), then the acts with real numbers and their links with natural (and integer) are defined and field of real numbers arises;
- all real numbers prove to be within negative real numbers to define imaginary ones (whose squares are negative numbers);
- hypercomplex numbers arise thanks to imaginary unit multiplying, new acts and links defining by statute of general number system.

Named stages increase levels of number systems. Their every original state is multiplied in its own content (in lower strata), and the higher the level the deeper this penetration. Process of level increasing changes the history, creates new times and dimensions which include all old ones and these new times are earlier than all known levels, they prove to be within the smallest known units.

The multiplying process turns every initial (good ordered) system into hazy field, and new haze belongs to a higher level than old order. Then this chaos is turned into organized system of new level by uniting act.

Natural numbers are multiplied within  $I$  as system with good defined acts (+) and ( $\times$ ); it leads to positive real numbers where (+) and ( $\times$ ) must have signs of a higher level. At first they are vague, then process of positive real numbers uniting allows to define (+) and ( $\times$ ) again, to create the laws (statute) of these numbers, their theory (sway), and the like.

Sway systems of all levels suggest their signals in order to arrange lower levels (for instance (/), then (.) in positive real numbers (1/10, 0.1)).

Functions, graphical images and other mathematical directions are described by  $A^\lambda$  more simple than numbers and number codes. Numbers in codes are the most significant in practice and the nearest to hierarchical systems. In them  $1_1 + \dots + 1_{10} \rightarrow 10_1^0 + \dots + 10_{10}^0 \rightarrow 10^1$ ;  $1/0.1 \rightarrow 10$ . Since that they were beyond (one-level) mathematical theories and have their exact definition only in  $A^\lambda$  (as well as changeable graphic images).

Natural grammars do not have all signs required in exact images of hierarchical systems. However, they allow the organisation of text changing in agreement with process of knowledge level increasing – when questions (hazy zones of mind) are turned into answers or orders (certain areas) and back, and members of texts (units, acts and other) are converted one into another as text is changes.

$A^\lambda$  and all its strata have their names in natural languages, and these names are similar to grammatical members of text. Any name may have many states, since it must be changed in process of text changing, and the sets of strata names are connected by their contents.

$A^\lambda$  strata are:

$\Lambda, \lambda$  – level (hierarchical number, time&space sign, range, strata, ...),

$P, \rho$  – act (process, technology, changing, ...),

$\Gamma, \gamma$  – statute (connection, law, characteristic, measure, ...),

$\Omega, \omega$  – singular system (thing, state, unit, detail, ...),

$\Sigma, \sigma$  – many systems (plural number, field, construction, contents, ...),

$B, \beta$  – hierarchical haze (vagueness, chaos, question, aim, task, ...), new (arising) strata,

$A, \alpha$  – authority (symbol system, sway, ...),

$A^\lambda$  – original system of level  $\lambda$ ,  $A^\beta$  – new authority of level  $\lambda$ , origin of higher level  $\beta$ .

$A^\lambda$  as a whole system has its own name – *aed*. *Aηδ* is ancient Hellenic word, and it denotes the author of symbol images of hierarchical systems – in old times and in arising ones (it is the profession of Homer). Now in many languages its heirs look as [´wedʒ], [´vedi], [´wit], [a´jat], [´odin] and the like, and all these meanings are connected with knowledge. Here it means – authority, hierarchical mathematics, knowledge measure, symbol of hierarchical multilevel systems.

Being the measure of knowledge, *aed* is similar to  $10^n$  or  $e^t$  in its ability to be a member of mathematical acts as the measuring unit; unlike  $10^n$  and  $e^t$ , it images not only units or processes but also laws and mechanisms of their changing.

$A^\lambda$  strata have also sets of signs beyond grammars: level may be signed by numbers in their (graphical) codes,  $\rho$  – by arrows ( $\rightarrow$ ,  $\uparrow$ ), or by (+,  $\times$ , /, ...),  $\gamma$  – by united arrows ( $\leftrightarrow$ ),  $\omega$  – by figures 1 or 10,  $\sigma$  – by {...},  $A$  – by 0 (as marks of origin),  $\beta$  – by (...) and the like.

$A^\lambda$  strata are changing marks, and their whole field may be changed too – new marks can arise in  $A^\lambda$  contents, and old ones can wane.

### 3. CYBERNETICS TASKS IN HIERARCHICAL MATHEMATICS

Cybernetics tasks (design&learning, innovating) are defined in  $A^\lambda$  as acts  $^+\rho^\lambda$  (design) and  $^\times\rho^\lambda$  (learning) (Fig. 1, 2). The mights of  $\rho^\lambda \leftrightarrow \{^\times\rho^\lambda, ^+\rho^\lambda\}$  ( $\rho^\lambda$  – general innovating process,  $\lambda$  – hierarchical number which include history  $\lambda_\tau$  and new times  $\beta$  (hazy zones of  $\lambda$ )) are beyond the aims of known design and learning systems. These odd systems must (by their own strategies) turn a vagueness of mind into good ordered knowledge – in answer to the questions. Act  $\rho^\lambda$  must do it, and  $\rho^\lambda$  must raise new haze (ask new questions) whose level is higher than one of old order. These joint tasks look too new and hard. But in fact  $\rho^\lambda$  is more simple and natural than its earlier state with odd strategies.

Now design&learning technologies prove to be connected, and they activate each other. The turn  $\{^+\rho^{\lambda_\tau}, ^\times\rho^\lambda, ^+\rho^\lambda, ^\times\rho^\beta, \dots\}$  changes hierarchical scheme in the following way: chaos of  $\lambda_\tau \rightarrow$  order of  $\lambda_0 \rightarrow$  haze of  $\lambda \rightarrow$  new order and vagueness of  $\beta \rightarrow \infty$ . It is similar to swaying scales (whose symbol is sign  $\infty$ ) and may be accounted as hierarchical mechanics which links and orders the process of higher and lower levels.

Mechanics of hierarchical systems works with their geometry and allows to define the new dimensions arising; the stratification of their contents (selection of attracting and sending zones within these dimensions); their spin, twist, charge, and ascendancy able to sway them; the ability of graphical images to be renovated by any of their detail (after this detail connecting with the other ones, or owing to the whole image multiplying in its contents), and many other facts which have direct inclusion in  $^\times\alpha^\lambda$  and  $^+\alpha^\lambda$ .

Scheme  $^+\alpha^\lambda$  changing may be also accounted as hierarchical arithmetic – arithmetic were all members (including acts and laws) have marks of level, hazy zones (new times), history (archives strata, active memory, old times turned into things in contents), and all other signs of  $A^\lambda$ . This arithmetic is inalienable with hierarchical schemes – as well as its earlier practical state with number codes and notes of acts.

It is easy to see that images in Fig. 1 and Fig. 2 are similar to habitual notes of arithmetical acts in schools. But the new schemes are more rich. Among all  $A^\lambda$  signs they have zones of numbers contacts. At first these zones are vague; then links of acting numbers and new numbers arise in them; chaos wanes in these areas, and new haze ascends where higher strata will grow.

All known arithmetical processors are strongly connected with paper notes of acts in number codes, and it allows to carry out all known mathematical tasks. Besides, notes of acts (+,  $\times$ ) in habitual codes contain laws of polynomial and matrix algebra. Now it is proved exactly since number codes (and changeable graphic images) have mathematical definition by  $A^\lambda$  means. Till  $A^\lambda$  they were

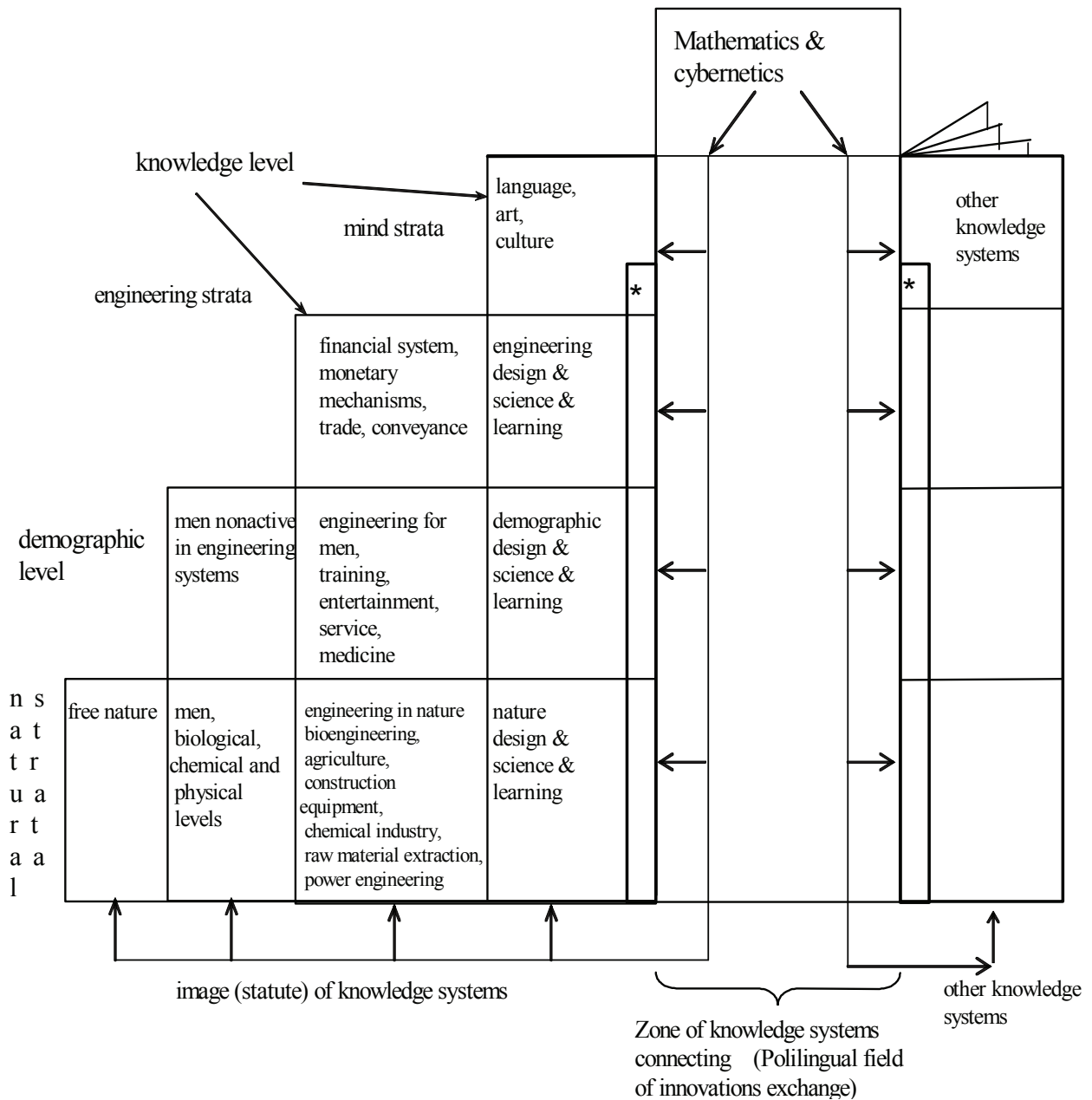
practical methods without exact statute – hierarchical gist of these methods is beyond onelevel theories.

$A^\lambda$  image  $+\alpha^\lambda$  is graphical scheme of *aed*-processor – technical means of cybernetics, cohered with its main tasks. It meets the requirements to technical documentation. They were in list of its aim together with the following ones: 1) ability to define the known symbol systems (among them mathematics&cybernetics directions – both theories and practical methods which can not be described by existent theories) and to link their definitions in one symbol system of higher level; 2) coherence with earlier history of hierarchical systems and with practical cybernetics (innovating technologies) in known strata constructed by this history.

Practical cybernetics works with field of its arising – with its archives, history of  $A^\lambda$ . History  $\alpha^\lambda$  of  $A^\lambda$  is defined by *aed* means in Fig. 3. Now its times are strata (physical, chemical, biological, demographical, and knowledge) authorised by mathematics. Fig. 3 is a fragment of the whole hierarchical system. It describes one knowledge system and zone of its interactions with the other units of its stratum. This zone is the mainstream where new authority arises. Suggested description is the general statute of knowledge systems. They may be organized as nations with their own States (State sway, i. e. legislative, executive, and justice systems, belongs to knowledge level) or without them – when sway is national language & culture.

Knowledge level has engineering strata which include industry and means of its ordering – conveyance, trade, financial systems and other. The main means of engineering strata improving are design&science&learning strata. They have direct contacts with all lower levels (physical, chemical, biological, demographical, and engineering) and send them all might of theoretical cybernetics  $\rho^\lambda$  – in agreement with  $A^\lambda$  laws. Concrete strata acquire these mights and define applied directions of innovating technologies.

Fig. 3 is now the only graphical scheme which connects all practical stages of innovating technologies including life cycles of new systems (applied design, making, test, conveyance, sale, work, service, utilization, renovation, staff training, financial and juridical maintenance, applied scientific investigations of systems (united by design strategies and multiplied by other stages of life cycle – making, conveyance, sale)). In fact, Fig. 3 is navigator in innovating technologies. It sets level of creating (or learning) a system, its history, contents (lower levels details and their links), its environments (systems of its own stratum), its holding systems (higher strata), its activity and aims in all known and arising systems.



**Fig. 3.** Practical cybernetics (innovating technologies) in polylingual field. (\*) – strata of State sway (legislative, executive, and justice systems). Hierarchical statute of knowledge system is scheme of (active) data base which contains and connects all known directions of knowledge – or images of known and arising systems of all strata – physical, chemical, biological, demographical, and knowledge (including engineering and mind activity). Strata images include their natural history (all strata below them), own one, and history of their renovating. Renovating history is marked by ranges of their own systems. Active systems are attracted by higher levels to mainstream (included in sway activity), the others are sending wide of sway ranges. Now the mainstream is zone of knowledge systems connecting. It is polylingual field. Individual languages cannot be sway systems in this field since they belong to one level. Their authority must be the system of new level, it is mathematics&cybernetics whose means are general for all strata and for all knowledge systems. These means can sway mind activity – to answer questions and to ask new questions from the level higher than old knowledge. The data base allows to order texts of names, questions and answers.

Strata images in Fig. 3 contain their natural history (time of their arising, i. e. all strata below them, which are included in their contents) and history of their renovating by higher strata – which lie above them. Renovating history is signed in strata images by ranges of their own systems. When new level arises, it stratifies lower ones – attracts their active systems to mainstream (in Fig. 3 – to the right) and sends the others to zones wide of its sway. For instance, demographical level contains strata of its natural history (physical, chemical, and biological) and ranges of systems active in engineering and financial layers, in art, science, design, and other directions of creative work. These ranges belong to renovating times (to sway layers).

Knowledge systems in Fig. 3 are linked by their active zones which contact with mainstream and at the same time lie within these systems as their internal connections. It is one of the merits of hierarchical schemes which allow to image graphically the facts irresistible for known geometry (where areas may be connected only by their boundaries).

Another merit is easiness of knowledge organisation in these schemes. In known library codes the new directions of science prove to be far away from the ones close to them by sense. For instance, biophysics cannot have number which connects physics and biology, while in Fig. 3 this number will always be found. It is convenient in data bases. Moreover, Fig. 3 is just the scheme of data base which contains and connects all known directions of knowledge – or images of all known and creating systems with history of these systems, their contents, activity, environment, holding systems, aims, and means of innovating technologies with these images.

#### 4. HIERARCHICAL SYSTEM OF NATURAL GRAMMARS

Natural (national) languages belong to knowledge level  $\nu$  ( $\nu \leftrightarrow \lambda - 1$ ). In agreement with statute  ${}^+\alpha^\nu$  of knowledge level (Fig. 3) they are hierarchical systems  $\{\omega_\tau^\nu\}$  which have their history  $\lambda_\tau \rightarrow \nu \rightarrow \lambda$ , contents  $\{\sigma_\tau^{\tilde{\nu}}\}$  (lover levels systems  $\{\omega_\tau^{\tilde{\lambda}}\}$  and their links  $\{\gamma_\tau^{\tilde{\nu}}\}$ ), environment  $\sigma^\nu$  (other systems of their level), activities  $\{\rho^{\tilde{\nu}}, \times\rho^{\tilde{\nu}}\}$  in known ( $\lambda_\tau$ ) and new ( $\nu, \lambda$ ) strata, authorities (their own sway systems (grammars)  $\{\alpha_\tau^\nu\}$  and general authority  $\alpha_0^\lambda \leftrightarrow \omega_0^\lambda$  – higher strata), and aims  $\{\beta_\tau^\nu\}$  in all strata.

History  $\lambda_\tau \rightarrow \nu \rightarrow \lambda$  of languages has three stages: natural  $\lambda_\tau \rightarrow \nu$  (time of arising), own  $\nu \rightarrow \lambda$  (time of authority) and renovating  $\lambda \rightarrow \beta$  (new time, it begins). Natural history of languages (times  $\lambda_\tau$  of knowledge level arising) in statute  ${}^+\alpha^\nu$  (Fig. 3) is turned into strata of languages contents: demographical  $\nu_d \leftrightarrow \nu - 1$ , biological  $\nu_b \leftrightarrow \nu - 2$ , chemical  $\nu_{ch} \leftrightarrow \nu - 3$ , and physical  $\nu_{ph} \leftrightarrow \nu - 4$ .

Own history  $\nu \leftrightarrow \{^{\times}\nu, ^{+}\nu\}$  is the time when knowledge level was the actual sway of hierarchical systems –  $^{\times}\nu$  is time of multiplying and  $^{+}\nu$  is time of uniting. These times are turned into engineering strata  $^{\times}\alpha^{\nu}$  and strata of mind activity  $^{+}\alpha^{\nu}$ .  $\{\alpha^{\nu}_{\tau}\}$  are sway systems directed to lower levels  $\lambda_{\tau}$  which are renovated by  $\{\alpha^{\nu}_{\tau}\}$ .  $\{\alpha^{\nu}_{\tau}\}$  are way of languages to new times.  $^{\times}\alpha^{\nu}$  and  $^{+}\alpha^{\nu}$  are connected by  $\rho^{\nu}$ . In time  $^{+}\nu$  the knowledge systems  $\{\omega^{\nu}_{\tau}\}$  (multiplied in  $^{\times}\nu$ ) interact in their field  $\sigma^{\nu}$ . Their links  $\{\alpha\gamma^{\nu}_{\tau}\} \leftrightarrow \gamma^{\nu}_{\sigma}$  are in all known strata. However, the most significant is exchange of knowledge – links  $\{\alpha\gamma^{\nu}_{\sigma}\}$  of engineering  $\{\alpha^{\nu}_{\tau}\}$  and mind  $\{^{+}\alpha^{\nu}_{\tau}\}$  strata. This exchange is realised in polylingual fields  $\sigma^{\nu}$  where systems  $\{\omega^{\nu}_{\tau}\}$  send their knowledge (innovations, ways of thinking and other) and attract alien ones. Process  $^{+}\rho^{\nu \rightarrow \lambda}$  of all strata connecting unites  $\sigma^{\nu}$  and leads to new time  $\lambda$  ( $^{+}\rho^{\nu \rightarrow \lambda} : \sigma^{\nu} \rightarrow \omega^{\lambda}_0$ , to new authority  $\omega^{\lambda}_0 \leftrightarrow \alpha^{\lambda}_0 \leftrightarrow \{^{+}\alpha^{\lambda}, ^{\times}\alpha^{\lambda}\}$ ). Renovating history  $\lambda \rightarrow \beta$  begins when  $\alpha^{\lambda}_0$  (in its multiplying  $^{\times}\rho^{\lambda}$ ) starts to send all its might to lower strata  $\{\lambda_{\tau}, \nu\}$ .

Authority  $\alpha^{\lambda}_0 \leftrightarrow \omega^{\lambda}_0$  of knowledge level is mathematics (which must define all strata  $\{\lambda, \gamma, \rho, \omega, \sigma, \beta, \alpha\}$  of hierarchical systems (including their history  $\lambda_{\tau} \rightarrow \lambda$  and mechanism  $\rho^{\lambda \rightarrow \beta}$  of new time arising – cybernetics technologies, mind activity).

Till now mathematics was chimerical system  $_{\beta}\alpha^{\lambda} \leftrightarrow \{^{10}\alpha^{\nu}_{\tau}\}$ ;  $\{^{10}\alpha^{\nu}_{\tau}\}$  – odd theories and practical methods suggested by leading units  $\{^{10}\omega^{\nu}_{\tau}\}$  of level  $\nu$ ; sign  $10_{\nu}$  is number of final authority  $\omega^{\nu}_{10}$  of level  $\nu$ ; when this number is in hazy zone  $\beta$ , it means that unit  $^{10}\omega^{\nu}_{\tau}$  intends to  $\omega^{\nu}_{10}$ .

Chimerical authority has many untied signs of lower strata. However it changes all known strata and other knowledge levels.

Natural languages which suggest mathematical methods and theories  $\{^{10}\alpha^{\nu}_{\tau}\}$  are attracted to mainstream  $\gamma^{\nu}_{\sigma}$  of whole hierarchical system – to new time  $\lambda$ .

Symbol systems  $^{10}\alpha^{\nu}_{\tau}$  and new ways of thinking  $^{10}\rho^{\nu}_{\tau}$  (mind activity when the chaos  $\beta^{\nu}$  of knowledge (questions area) is turned into answers or orders  $_{\omega}\gamma^{\nu}$ ,  $\gamma^{\nu}_{\sigma}$ , and new haze  $\beta^{\lambda}$  ascends beyond old horizons  $\beta^{\nu}$  of thoughts) are included in sway ranges  $_{\beta}\alpha^{\lambda}$  of arising authority  $\alpha^{\lambda}_0$ . Owing to that the ancient languages – as authors of mathematical means – are the most active systems of new times. Old languages, being turned into general symbol systems, connect polylingual field  $\sigma^{\lambda}$  and are included in other languages (by multiplying act  $^{10\times}\rho^{\nu}$ ) as their sway strata.

While chimerical authority  $_{\beta}\alpha^{\lambda}$  does not define general scheme  $\alpha^{\lambda}_0$  and laws  $\gamma^{\lambda}_0$  of mind activity  $\rho^{\lambda}$  in whole hierarchical system, the individual languages  $\{\omega^{\nu}_{\tau}\}$  continue working by their own means. In order to exchange their knowledge, the units  $\{\omega^{\nu}_{\tau}\}$  describe their works by one language  $^{10}\omega^{\nu}_{\tau}$  – leading on the certain time  $\tau$ . It is long practice (with small number of leading languages).



Since all languages  $\{\omega_\tau^v\}$  (and leading ones) are ordinary systems of time  $v$ , none of them can be acting sway  $\{\omega_{10}^v\}$  (in their field  $\sigma^v$ ) able to increase their level with  $v$  to  $\lambda$  and to  $\beta$ .

All languages contain more or less rich knowledge about all strata described in Fig. 3. And their knowledge is imaged by texts – changeable symbols of systems. These symbols may be short (one lexical unit – word) or long (when they define all hierarchical signs ( $A^\lambda$  strata) of systems and stages of their changing). They may be hazy or certain, and may be changed with questions to answers or orders and back. There are texts within languages whose level is equal to one of the whole language – since these texts are images-statutes of their languages. These images are natural grammars – sway systems  $\{\alpha_\tau^0\}$  of national languages  $\{\omega_\tau^v\}$ .

In fact, natural grammars belong to mathematics&cybernetics – as practical methods with the highest significance in mind activity – together with graphical images processing, number codes (first mathematical symbols of hierarchical systems), and notes of laws as functions.

Owing to mathematical gist of grammars they are the links (direct contacts) of national languages with general authority of knowledge. And this authority has ascendancy to change level of hierarchical systems. The increase of the level of grammars means the increase of the level of their languages. Mathematical means  $\{^+\alpha^\lambda, ^x\alpha^\lambda\}$  allow it to be done. Suggested above mathematical investigation of languages contents (knowledge strata in Fig. 3 – connected images of all known and arising systems), their history, field of exchange, attraction to authority, and other signs of their hierarchical nature was carried out with the named aim.

Linguistics distinguishes three main states of natural grammars – root grammars, analytic and synthetic ones, and four states of texts (sentences) – interrogative (questions), narrative, exclamatory, and imperative (answers and orders). Any state of grammars has its own means to order lexical units in texts and to change the texts with questions to answers or orders and back.

**Root grammars**  ${}_\gamma\alpha_\tau^v \leftrightarrow \gamma_\tau^v$ . (The instances – Chinese, Vietnamese, ...).

Root grammars (hidden authority) are oriented on syntax  $\gamma_\tau^v$  – sway of statute. Grammars  $\{{}_\gamma\alpha_\tau^v\}$  have lexical units  $\{\omega_\tau^{v/2}\}$  for making concrete knowledge (members of contents of knowledge statute in Fig. 3) and syntax  $\{\gamma_\tau^v\}$  – laws of order of lexical units in texts  $\{\omega_\tau^{v/1}\}$ . This order defines the state of text – hazy  $\{{}_\beta\omega_\tau^{v/1}\}$  (questions) or certain:  $\{{}_\sigma\omega_\tau^{v/1}\}$  (answers) and  $\{{}_\omega\omega_\tau^{v/1}\}$  (orders), and only it assigns the marks of hierarchical strata (thing ( $\omega$ ), act ( $\rho$ ), characteristic ( $\gamma$ ), time ( $\lambda, \tau$ ) and other).

Since all grammars contain root grammars, the instances of their work may be made in English: two lexical units ‘symbol’ and ‘system’ change their strata signs when their order in text is changed – ‘symbol system’ or ‘system symbol’. In the first case ‘system’ is thing and ‘symbol’ is characteristic, then their signs are turned into one another.

Sway of root grammars is hidden in text, it is the way (dao) of thinking process. Level of any text in these grammars is always lower than one of grammars.

**Analytic grammars**  ${}_{10}\alpha_{\tau}^{\nu} \leftrightarrow \omega_{10\tau}^{\nu}$  (English, French, German, Hindi, ...).

Analytic grammars (tutor authority) have key texts  $\omega_{10,\tau}^{\nu}$  – distinguished lexical units  $\{\omega_{10\tau}^{\nu/1}\}$  (in English  $\{\omega_{10\tau}^{\nu/1}\} \leftrightarrow \{a, the, to, do, is, have, \dots\}$ ) and laws  $\gamma_{10\tau}^{\nu/1}$  of their changing and ordering in agreement with mind activity. Hierarchical strata signs are marked by units  $\{\omega_{10\tau}^{\nu/1}\}$  (in English – ‘a’ for hazy thing, ‘the’ – for certain one, ‘to’ for acts, ‘was’ for earlier times, ‘will’ for arising times, and the like). In mind activity (when acts are turned into units, and units – into other strata) members  $\{\omega_{\tau 10}^{\nu/1}\}$  of key text are changed. Texts  $\{\omega_{\tau}^{\nu/1}\}$  in analytic grammars are organized by key text and are tied with concrete systems (with knowledge statute in Fig. 3) by lexical symbols (names) of these systems – physical, chemical and other.

Sway system (key text) has dual gist in  ${}_{10}\alpha_{\tau}^{\nu}$  languages. It is both – ordinary text (with habitual letters in contents) and image of higher authority. This system is the only capable to connect symbols of chemical or demographical systems (lower levels) with higher strata (laws of thought changing). It takes into account the concrete state of knowledge (its address in Fig. 3) but it holds all texts and changes them in agreement mainly with its will. The tutor authority is the actual leading unit.

**Synthetic grammars**  ${}_{0}^{\lambda}\alpha_{\tau}^{\nu} \leftrightarrow {}_{0}^{\lambda}\omega_{\tau}^{\nu}$  (Belarusan, Finish, Japanese, certain ancient languages – Khemian, Hellenic, ...).

Synthetic grammars (total authority in time  $\nu$  – chimerical one in time  $\lambda$ ) turn key texts into system of sway signals  $\{{}_{0}^{\lambda}\omega_{\tau}^{\nu/1}\}$  – the shortest lexical units with laws  $\{{}_{0}^{\lambda}\gamma_{\tau}^{\nu}\}$  of their activities.

The signals  $\{{}_{0}^{\lambda}\omega_{\tau}^{\nu}\}$  are included in symbols of concrete systems, possibly – in their means. This including causes the waves of letter changes (phonetic changes) in systems symbols which have hazy zones in their contents, and thanks to that they are able to include sway signals and to be changed by them. It allows to turn long text into one lexical unit – into symbol of this text. This symbol contains and connects both concrete knowledge (name, hierarchical number (address) of concrete system in knowledge statute in Fig. 3) and thinking process. In this way the level of text

increases (from  $\sigma_{\tau}^{\nu}$  to  ${}^{\lambda}_0\omega_{\tau}^{\nu}$ ) owing to the inclusion of sway signals in its contents by sway system multiplying. Growth of level leads to texts abridging as it must be in the process of symbols arising.

Synthetic grammars contain all means of root and analytic grammars, but they prefer their own state which, in practice, is free from syntax. It means that total authority in them may be turned in chimerical one (on a higher level). In that case any unit of text can regard itself as higher sway, and it may lead to its chaotic activity.

Since English was synthetic (and keeps certain lines of this state) it allows to bring instance: characteristic 'chimerical' includes three sway signals: 'er', 'ic' and 'al'. They all signify the membership – they are signs of adjective (characteristic, range of sway, the distance from mainstream). Two of them ('er' and 'ic') are included in the means of lexical unit, and their including causes the waves of letters (and phonetic) changes. Its origin is Khemi (Chemy) – name of ancient Egypt. 'Chimera' is sphinx – system which has odd features of men and animals (systems of higher and lower strata together); sound changes are [ $\prime$ kemi] – [ $\text{kai} \prime$ miərə] – [ $\text{kai} \prime$ merikəl].

It is easy to see the following.

- 1) In order to describe the main states of grammars and texts the marks of hierarchical systems were attracted – since own means of grammars do not allow it to be done. (As well as own means of number codes, graphical images and other mathematical directions do not allow to define their own statutes and natural grammars.)
- 2) Suggested description of natural grammars corresponds exactly both to mathematical images of cybernetics process in Fig. 2 (the stills in Fig. 2 were selected in the whole images of level increasing process  $\rho^{\lambda}$  just to define natural grammars) and to knowledge statute in Fig. 3 (Fig. 2 is included in Fig. 3 with name 'mathematics&cybernetics' above all strata).
- 3) Individual characteristics of natural grammars are strongly connected with ones of national minds. Mathematical investigations of natural grammars give a chance to understand general lines of diverse nations and to improve the process of their connecting – including innovations exchange in polylingual fields.
- 4)  $A^{\lambda}$  schemes are much more rich than natural grammars. All strata  $\{\lambda, \gamma, \rho, \omega, \sigma, \beta, \alpha\}$  of  $A^{\lambda}$  may have all other ones as their signs in their contents. For instance a thing or laws may have sign of time (earlier, current and arising) while in natural grammars this sign is connected habitually with acts. The definition of innovating technologies in  $A^{\lambda}$  contains all known ways of thinking in natural grammars and connects them. Hence, mathematics can suggest exact images of cybernetics (innovating technologies) to any language without a danger to limit its abilities. Moreover, when mathematical schemes of these technologies will be included in natural languages it can increase the mights of languages and their abilities for all other minds understanding. Beside that, the including  $A^{\lambda}$  means in knowledge systems brings connected definitions of theories and practical methods of mathematics&cybernetics to these systems.

## 5. CONCLUSION

Hierarchical mathematics  $A^\lambda$  allows definition of the all strata of its natural history – physical, chemical, biological, demographical, and knowledge (with engineering directions and mind activity in symbol systems). Their definitions are connected in general scheme of knowledge authorized by mathematics (which includes cybernetics means – innovating technologies). These means correspond to mind activity when hazy zones (questions) are turned into certain areas (answers or orders) and then – into new vagueness with wider horizons of thought.

Hierarchical scheme of knowledge strata (active data base) with cybernetic processor of its changing (in agreement with innovating (design&learning) technologies) is suggested in the paper as means able to improve the known practice of innovations exchange in polylingual fields.

Natural languages in the light of suggested scheme are hierarchical systems which have all strata of knowledge (physical, chemical and other) and their own means of mind activity (and text) organizing in these strata – natural grammars.

Natural grammars are defined by hierarchical mathematics as sway systems of their languages, and these sway systems are linked as stages of mind activity in innovating process. Owing to that the connecting of natural languages in innovations exchange may be simplified.

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**СТАТУТ**  
**Грамадскага аб'яднання**  
**“ІНСТЫТУТ МАТЭМАТЫКІ І КІБЕРНЕТЫКІ”<sup>1</sup>**

**1. АГУЛЬНЫЯ АСНОВЫ**

- 1.1 Грамадскае аб'яднанне “Інстытут матэматыкі і кібернетыкі” (далей па тэксце - ІМК) з'яўляецца добраахвотным утварэннем яго членаў, на аснове агульнай згоды з мэтай удасканалення вядомых і стварэння новых матэматычных і кібернетычных тэорый і тэхналогій, узмацнення іх сувязі з вытворчасцю.
- 1.2 ІМК дзейнічае згодна дадзенаму Статуту і ў адпаведнасці з дзеючай Канстытуцыяй Рэспублікі Беларусь, Дэкрэтам Прэзідэнта Рэспублікі Беларусь ад 26.01.1999 № 2, Законам Рэспублікі Беларусь “Аб грамадскіх аб'яднаннях” і іншымі актамі заканадаўства Рэспублікі Беларусь.
- 1.3 ІМК дзейнічае на ўсёй тэрыторыі Рэспублікі Беларусь.
- 1.4 ІМК з'яўляецца юрыдычнай асобай, мае ўласнасць, рахункі ў банках (у тым ліку валютныя), круглую пячатку, вуглавы штамп, бланкі са сваёй назвай, сімволіку зацверджаную і зарэгістраваную ва ўстаноўленым парадку. Мясцовыя арганізацыі ІМК могуць з'яўляцца юрыдычнымі асобамі і мець усе згаданыя адзнакі.
- 1.5 ІМК супрацоўнічае з дзяржаўнымі і наддзяржаўнымі інстытутамі, творчымі і вытворчымі ўстановамі і аб'яднаннямі, сродкамі друку, радыё, тэлебачання, электроннай сувязі, іншымі ўстановамі ў Беларусі і навакольным свеце на аснове пагадненняў, якія не супярэчаць уласнаму Статуту ІМК і дзеючаму заканадаўству Рэспублікі Беларусь.
- 1.6 Справаводства ІМК вядзецца ў парадку ўстаноўленым дзеючым заканадаўствам. Матэрыялы накіроўваюцца ў аддзяленне Нацыянальнага архіву па месцы знаходжання юрыдычнага адраса.
- 1.7 Юрыдычны адрас ІМК: 220064, г. Мінск, вул. Ландара д. 72 к. 3 кв. 56.

**2. МЭТЫ, ЗАДАЧЫ І МЕТАДЫ ДЗЕЙНАСЦІ ІМК**

- 2.1 Асноўнай мэтай ІМК з'яўляецца рост узроўня матэматыкі і кібернетыкі, узмацненне іх сувязі з іншымі кірункамі дзейнасці ў Беларусі і свеце.
- 2.2 Асноўныя задачы ІМК:
- удасканаленне вядомых і стварэнне новых матэматычных і кібернетычных тэорый і тэхналогій;

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<sup>1</sup> Прыняты Агульным Сходам ІМК 20 мая 1997 г.

Зарэгістраваны Міністэрствам юстыцыі Рэспублікі Беларусь 11 ліпеня 1997г. Пасведчанне аб рэгістрацыі № 0944

Змены ўнесены Радай ІМК 28 мая 1999 г.

Перарэгістраваны Міністэрствам юстыцыі Рэспублікі Беларусь 29 верасня 1999г. Пасведчанне аб рэгістрацыі № 00726

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- дакладнае азначэнне ў матэматычных і кібернетычных выразах усіх вядомых і новых (узнікаючых) страт свету - прыродных (фізічных, хімічных, біялагічных), дэмаграфічных, вытворчых (уласна вытворчасці і сродкаў яе ўладкавання - сувязі, таргоўлі, гандлю, манетарных механізмаў) і творчых (мовы, мастацтва, канструявання, навукі і асветы), абуджэнне актыўнасці вядомых і новых прафесійных кірункаў у стварэнні згаданых азначэнняў і ў руху змены матэматыкі і кібернетыкі;
- стварэнне і ўдзел у дзейнасці вытворчых і творчых устаноў і часовых утварэнняў, калі гэта звязана з выкананнем Статутных мэт і задач;
- азначэнне тэарэтычнай і практычнай вартасці канкрэтных вынікаў у межах уласных прафесійных кірункаў (матэматыкі і кібернетыкі) з адказнасцю за дакладнасць адзнак; прапанова годных вынікаў, атрыманых у Беларусі, у іншыя краіны і годных з іншых краін - у Беларусь з абаронай аўтарскага права і адказнасцю за ўмацаванне аўтарытэта Беларусі ў свеце.

### 2.3 Асноўныя метады дзейнасці ІМК:

- вядзенне ў парадку азначаным дзеючым заканадаўствам творчай дзейнасці (навуковай, асветнай, канструктарскай і мастацкай) і выкананне вытворча-гаспадарчай дзейнасці, стварэнне вытворчых і творчых адзінак без абмежавання часу іх дзейнасці і часовых утварэнняў, накіраваных на выкананне Статутных задач і здзяйсненне Статутных мэт;
- атрыманне адзнак аўтарскага права на вынікі ўласнай дзейнасці і карыстанне імі;
- выкананне выдавецкай дзейнасці ў парадку азначаным дзеючым заканадаўствам для здзяйснення Статутных мэт і задач ІМК;
- арганізацыя і правядзенне выставак, курсаў лекцый, паведамленняў у перыядычным друку, радыё і тэлеперадач, паведамленняў у другіх сродках сувязі (у тым ліку электронных), звязаных з уласнай дзейнасцю і дзейнасцю іншых асоб і устаноў, якая мае дачыненне да ўласных прафесійных кірункаў;
- арганізацыя і правядзенне навуковых і навукова-практычных (у тым ліку міжнародных) сустрэч, сходаў і абмеркаванняў (сімпозіумаў, канферэнцый, семінараў і інш.) у межах уласнай прафесійнай дзейнасці і звязаных з ёй кірунках;
- вядзенне згодна дзеючаму заканадаўству прафесійнай падрыхтоўкі асоб, стварэнне Навуковых Рад, здольных азначаць вартасць вынікаў і надзяляць іх аўтараў адпаведнымі адзнакамі прафесійнай годнасці;
- заключэнне ў Рэспубліцы Беларусь і за яе межамі пагадненняў (дамоў, кантрактаў і др.) аб часовым і неабмежаваным у часе супрацоўніцтве з дзяржаўнымі і наддзяржаўнымі ўстановамі, асобамі, творчымі і вытворчымі аб'яднаннямі і адзінкамі, заснаванне іх, уключэнне ў іх склад, калі іх Статутныя дакументы не супярэчаць уласнаму Статуту, законам Рэспублікі Беларусь, другіх дзяржаў і наддзяржаўных утварэнняў, у якіх заключаюцца і выконваюцца згаданыя пагадненні.

### **3. УМОВЫ ЧЛЕНСТВА ІМК**

- 3.1 ІМК прадугледжвае членства фізічных асоб. Членства фіксаванае.
- 3.2 Членамі ІМК могуць быць грамадзяне Рэспублікі Беларусь, замежныя грамадзяне і асобы без грамадзянства, якія дасягнулі 18-гадовага ўзросту, прызнаюць яго Статут і непасрэдна маюць удзел у яго працы, плацяць уступныя і членскія ўзносы, выказваюць жаданне і здольнасці ўдасканалваць вядомыя і ствараць новыя матэматычныя і кібернетычныя тэорыі і тэхналогіі, укараняць іх, мець удзел у азначэнні іх тэарэтычнай і практычнай вартасці, усталёўваць сувязі з другімі кірункамі дзейнасці.
- 3.3 Асобы, чые вынікі ў кірунках дзейнасці ІМК прызнаюцца адметнымі Радай ІМК, могуць (з іх згоды) атрымаць адзнакі годнасці ганаровых членаў ІМК па прапанове Рады ІМК.
- 3.4 Уключэнне ў члены ІМК і выхад з яго складу, а таксама парадак уліку вядзеца Радай ці мясцовымі арганізацыямі і зацвярджаецца рашэннем Рады.
- 3.5 Падставай для ўступлення ў ІМК з'яўляецца пісьмовая заява. Рашэнне аб залічэнні ў склад ІМК лічыцца зацверджаным, калі за яго прагаласавала большасць членаў Рады.
- 3.6 Члены ІМК маюць права:
- выбіраць і быць абранымі ў склад выбарных органаў;
  - атрымліваць звесткі аб дзейнасці ІМК;
  - рабіць прапановы па пытаннях, якія ўваходзяць у колы дзейнасці ІМК і удзельнічаць у іх абмеркаванні;
  - карыстацца ўсімі магчымасцямі, што прадастаўляюцца ІМК.
- 3.7 Члены ІМК абавязаны:
- ажыццяўляць сваю дзейнасць згодна са Статутам ІМК і нормаў дзеючага заканадаўства,
  - выконваць рашэнні кіруючых органаў ІМК;
  - плаціць уступныя і членскія складкі;
  - адказваць у выбарных органах ІМК і Агульным Сходзе за страты ўласнага ладу ІМК і яго аўтарытэту ў навакольным свеце.

### **4. СТРУКТУРА І ОРГАНЫ КІРАВАННЯ ІМК**

- 4.1 Асновай ІМК з'яўляюцца мясцовыя арганізацыі (абласныя, раённыя (гарадскія)). Яны ствараюцца і атрымліваюць статус юрыдычнай асобы згодна з рашэннем Рады. Мясцовыя арганізацыі могуць быць створаны калі ў раёне (горадзе), вобласці ёсць не менш за тры члены ІМК. Структура выбарных органаў і парадак дзейнасці мясцовых арганізацый вызначаюцца іх вышэйшым органам. Мясцовыя арганізацыі маюць мэты і задачы адпаведныя мэтам і задачам ІМК, і дзейнічаюць у межах сваіх рэгіёнаў.
- 4.2 Вышэйшым органам кіравання ІМК з'яўляецца Агульны Сход. Агульны Сход правамоцны прымаць рашэнні па любых пытаннях дзейнасці ІМК.
- 4.3 Чарговы Агульны Сход збіраецца адзін раз у год. Нечарговы Агульны Сход можа склікацца па патрабаванню Рады, Рэвізійнай Камісіі ці не меней 1/3 членаў ІМК.

4.4 Агульны Сход ІМК лічыцца правамоцным, калі на ім прадстаўлена 2/3 яго членаў. Рашэнні прымаюцца простаю большасцю галасоў.

4.5 Выключна да дзейнасці Агульнага Сходу адносяцца:

- зацвярджэнне Статута, унясенне змяненняў і дапаўненняў у яго;
- азначэнне асноўных кірункаў дзейнасці ІМК;
- выбранне Рады, Дырэктара, Дырэкцыі, навуковага сакратара і Рэвізійнай Камісіі;
- разгляд і зацвярджэнне справаздач;
- прызначэнне ліквідацыйнай камісіі;
- спыненне дзейнасці ІМК.

4.6 Кіруючым органам ІМК у перыяд паміж Агульнымі Сходамі з'яўляецца Рада, якая выбіраецца Агульным Сходам на чатыры гады.

4.7 Рада ІМК:

- уносіць змяненні і дапаўненні ў Статут;
- распрацоўвае і прымае рэгламент сваёй працы;
- склікае Агульны Сход, устанаўлівае нормы прадстаўніцтва;
- кіруе творчай і вытворча-гаспадарчай дзейнасцю, распараджаецца маёмасцю і фінансавымі сродкамі;
- зацвярджае пячатку і сімваліку ІМК;
- зацвярджае каштарысы і справаздачы аб размеркаванні і скарыстанні сродкаў ІМК;
- зацвярджае ўтварэнне і азначае статус мясцовых арганізацый;
- прымае ў члены ІМК і выключае з членаў ІМК; зацвярджае адпаведныя рашэнні мясцовых арганізацый.

4.8 Выканаўча-распарадчую дзейнасць ІМК здзяйсняе Дырэкцыя, у склад якой уваходзяць Дырэктар ІМК, дырэктары па асноўных кірунках дзейнасці ІМК і навуковы сакратар ІМК. Дырэкцыя выбіраецца Агульным Сходам на чатыры гады.

4.9 Кіраўніком ІМК з'яўляецца Дырэктар ІМК, які выбіраецца Агульным Сходам на чатыры гады.

4.10 Дырэктар валодае ўсімі правамі і абавязкамі кіраўніка юрыдычнай асобы, у тым ліку:

- прапануе на Радзе і на Агульным Сходзе змяненні і дапаўненні ў Статут ІМК;
- вядзе Агульныя Сходы, узначальвае паседжанні Рады і Дырэкцыі;
- заключае дагаворы;
- адкрывае рахункі ў банках;
- прадстаўляе ІМК у інстытутах дзяржаўнай улады, грамадскіх аб'яднаннях і іншых краінах;
- выконвае іншыя абавязкі ў межах яго паўнамоцтваў.



## **5. МАТЭРЫЯЛЬНА-ФІНАНСАВАЯ АСНОВА ДЗЕЙНАСЦІ ІМК.**

5.1 ІМК можа мець ва ўласнасці любую маёмасць, неабходную яму для матэрыяльнага забеспячэння дзейнасці, прадугледжанай Статутам ІМК, за выключэннем аб'ектаў, якія, згодна з законам, могуць знаходзіцца толькі ва ўласнасці дзяржавы.

5.2 Грашовыя сродкі ІМК фарміруюцца з:

- уступных і членскіх узносаў;
- дабраахвотных ахвяраванняў;
- паступленняў ад правядзення лекцый, выставак і іншых мерапрыемстваў;
- даходаў ад творчай і вытворча-гаспадарчай дзейнасці;
- іншых не забароненых заканадаўствам паступленняў.

Сродкі і маёмасць ІМК не могуць пераразмяркоўвацца паміж членамі ІМК і выкарыстоўваюцца толькі для выканання Статутных мэт і задач; дапускаецца выкарыстанне ІМК сваіх сродкаў на дабрачынныя мэты.

## **6. РЭВІЗІЙНАЯ КАМІСІЯ ІМК.**

6.1 Кантроль гаспадарчай і фінансавай дзейнасці ІМК, а таксама ўваходзячых у яго структурных падраздзяленняў, ажыццяўляецца Рэвізійнай Камісіяй у складзе не менш за 3 чалавекі. Члены Рэвізійнай камісіі абіраюцца агульным сходам на чатыры гады.

Працай камісіі кіруе старшыня, выбраны са складу рэвізійнай камісіі яе членамі.

6.2 Рэвізійная Камісія праводзіць кожны год не менш за адну рэвізію фінансава-гаспадарчай дзейнасці ІМК, перыядычна правярае структурныя падраздзяленні і прадстаўляе заключэнні Радзе на гадавой справаздачы аб дзейнасці ІМК.

## **7. МІЖНАРОДНЫЯ СУВЯЗІ ІМК.**

7.1 ІМК у адпаведнасці са Статутам можа ўступаць у міжнародныя грамадскія аб'яднанні, удзельнічаць у стварэнні міжнародных саюзаў, грамадскіх аб'яднанняў, падтрымліваць прамыя міжнародныя кантакты і сувязі, заключаць адпаведныя пагадненні і рабіць іншыя захады, якія не супярэчаць заканадаўству Рэспублікі Беларусь і яе міжнародным абавязацельствам.

## **8. СПЫНЕННЕ ДЗЕЙНАСЦІ ІМК.**

8.1 Спыненне дзейнасці ІМК можа быць здзейснена па рашэнні Агульнага Сходу, калі яго падтрымліваюць не меней за 2/3 членаў ІМК, або суда.

8.2 Калі дзейнасць ІМК спыняецца, маёмасць і сродкі, якія застаюцца пасля разліку з банкамі, бюджэтам і іншымі крэдытарамі, накіроўваюцца на мэты, прадугледжаныя Статутам ІМК.



СПІС ЛІТАРАТУРЫ ПА  
АЭД І ІЕРАРХІЧНАЙ  
МАТЭМАТЫЦЫ



**СПІС ПУБЛІКАЦЫЙ  
ПА АЭД-ТЭОРЫІ (ТЭОРЫІ ВЕДАЎ)  
(ІНСТЫТУТА МАТЭМАТЫКІ І КІБЕРНЕТЫКІ,  
ЛАБАРАТОРЫІ ІЕРАРХІЧНЫХ МНОГАЎЗРОЎНЕВЫХ СІСТЭМ,  
СВЕТЛАНЫ НОВІКАВАЙ І ЯЕ НАВУКОВАЙ ГРУПЫ Ў ІТК АН БССР,  
А ТАКСАМА – ВУЧНЯЎ С. НОВІКАВАЙ І НАВУКОВЫХ ГРУП,  
СТВОРАНЫХ ІМІ Ў ІНШЫХ ДАСЛЕДЧЫХ УСТАНОВАХ)**

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### **Публікації Інститута Математики і Кібернетики сумесна з Лабораторией Ієрархічних Многаўроўневых Сістэм**

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