

## Genesis of Life

Conditions complex for the Origins, Evolution, Essence and Nature of Life  
by the means of moderate cover essential need optimization due to appropriate  
sustainable interaction phenomenon at Natural Genesis and Synthesis

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### Abstract

I propose a general theory about the genesis and nature of life(optimum). It seems to be based as a rule on interaction between symmetry and asymmetry ( $\sim$  stability and flexibility) for equilibration. In that kind of inter-, multi- and transdisciplinary research these concept generalized and deepens previous trials to explain the question what is life. A possible deduction could be show exemplary in the relevant context of following relations:

entropy/negentropy = xýntropy and analogue  $m/E = I$  ( $m \sim I \sim E$ ) [ $(m \sim E) \sim I$ ]  
respectively  $m/h\nu = k$  as well as  $mv^2/h\nu = hR$   
( $\sim$  constants:  $m_e/hR = k \sim \text{mol: } m/U = S$ )  
e.g. :  $hR/h = R$   
 $\sim$  Planck units:  $m/E = I$  ( $E/T$ )  
 $\sim$  Life:  $m^{-1}/s \approx m^{-1} \cdot s^{-1}$  (culmination point: stationary: opt. = 1)  
{interdependence  $\approx$  interrelation  $\sim$  proportion ( $\sim$  ratio, relation)  $\approx$  correlation  
[e.g.: proportional (energy term/time)  $\approx$  correlation level  
correlation: frequency (spatial)/time  $\approx$  frequency (local  $\cdot$  temporal)  
wave number-frequency diagram:  
atmospheric sciences: wave number/period  $\approx$  frequencies/wave numbers]}

Finally the data of this exploration show that nature of life is predictable by suitable methods for measurement like e.g. microscopy, spectroscopy and probability. As a result, the way of life goes the optimal friction by essential level of efficiency energy use like as (neg)entropy.

Key words: (a)symmetry  $\cdot$  (neg)entropy  $\cdot$  (nucleo)genesis  $\cdot$  (element)synthesis  $\cdot$   
Schrödinger equation  $\cdot$  life  $\cdot$  evolution  $\cdot$  stationary  $\cdot$  probability  $\cdot$  equilibrium  $\cdot$  growth  $\cdot$   
decay  $\cdot$  development  $\cdot$  interaction  $\cdot$  transformation.

## 1 Introduction

The purpose of this attempt was to review a comprehensive and fundamental explanation of life. In his book *What is Life?* Erwin Schrödinger replied with his own concept of "negentropy (i.e. negative entropy)". The question still remains unanswered however. This article is an attempt for indicate the nature of life. To discover hear a general basic theory of life is novel.

## 2 Attempt to Derive a General Theory of Life ( $\sim\Omega$ ) with Definition

A dyssymmetric singularity (bifurcation) could rather have excellent the amorphous orpoint (e.g. big bang) of the cosmogenesis, the so-called apeiron respectively

quintessence than the cosmology so far with the following words accepted: In the beginning it was symmetry, as expressed by the current predominant scientific mode. This so-called "initial symmetry" was broken up less than a moment later and unfolded our known 4 interactive forces symmetry from an assumed "initial strength". With this first symmetry-breakup, the basic conditions for life, the interaction between symmetry, dissymmetry and symmetry-breakup with subsequent developing interrelationship in form of a dynamical nonlinear controlled feedback circuit between Symmetry/Asymmetry via symmetry breaking or, more simply expressed as the stability/flexibility ratio, was perhaps created.

An initially obvious and empirical piece of evidence for the ensuing evolution is provided by the nucleon synthesis.

### Signs for asymmetry

On the one hand, it is the nuclear binding energy curve which represents the energy difference between the nucleons bound together in the nucleus by powerful forces against the opposing energy necessary to separate these nucleons from each other's company. The vertical progress of the elements (nuclides: I. light until IV. very light or heavy) is asymmetric in this case, i.e. a symmetry-breakup takes place from one to the other when the nuclear binding energy curve respectively falls or rises. Going from the lightest element  $^1\text{H}$  (hydrogen) up to  $^{56}\text{Fe}$  (iron) the nuclear binding energy rises as a result of fusion processes, whereas on the other side it increases as a result of decay processes, again as far as  $^{56}\text{Fe}$ . This is taking  $^{56}\text{Fe}$  to be the most stable element.

Nucleosynthesis by fusion with 3-alpha-process, proton-proton-cycle and Bethe-Weizsäcker-cycle (CNO cycle) show another example.

Furthermore nuclear binding energy by non equal numbers of neutrons and protons, where n-p interaction in a nucleus is stronger than either the n-n or p-p interaction ( $\sim$  symmetry correction term) [e.g.: H, F, Na, P( $\sim$ As), Cl, K, V, Cr, Mn, Fe, Co, Cu, Zn, Se( $\sim$ Te), Mo, Sn, J ( $\sim$ Te)].

Also  $\beta^-$  and  $\beta^+$  decay [ $\geq$  stability line ( $\sim$  zone)] by nucleosynthesis is asymm.

In nucleogenetic processes they mainly appear in association with the spontaneous symmetry-breakup in the life-essential elements.

Isotopic evolution empirically confirms the above observations, particularly in neutron-count development, just as through the course of isotons, isobars and isomers.

Furthermore the formation(s) and structure(s) of atoms, molecules and crystals are asymmetric.

Life seems to be directly related to asymmetry (symmetry-breakup) processes.

*For verifying such asymmetries use methods of functions with there relevant distributions like log logistic and log normal as well as nonlinear ordinary and partial differential equations (ODE and PDE) [e.g.: stochastic PDE  $\sim$  log normal distribution; stochastic ODE  $\sim$  log logistic distribution] inter alia.*

*Furthermore could be geometric ( $\sim$  topologic) differential algebra (e.g. knot theory) and category theory a suitable method in morphometrics for shapes (forms) formation and holistic systems etc.*

*Another way in general could be relations as asymmetrical relations respectively non-associative operations as well as also their corresponding mappings (e.g.: set algebra) and set theory.*

### Features of symmetry

On the other hand, the horizontal progress of element synthesis between H and iodine, where the life-essential elements occur, indicates regular symmetry between the medium heavy elements (III.) of lower neutron-count than  $^{56}\text{Fe}$  as opposed to their vertical and horizontal partners of higher neutron-count (for example:  $^{54}\text{Fe}$ ,  $^{55}\text{Mn}$ / $^{58}\text{Ni}$ ,  $^{59}\text{Co}$ ...).

Furthermore nuclear binding energy by equal numbers of neutrons and protons, where n-p interaction in a nucleus is stronger than either the n-n or p-p interaction ( $\sim$  symmetry correction term) [e.g.: B, C, N, O, Mg, Si, S, Ca].

Beta decay ( $\beta^-$ )  $\sim$   $\beta^+$  decay by fission looks like symmetrical [ $\beta^-$ : e.g.: K – J included 13 elements of life and  $\beta^+$ : e.g.: H – K included also 13 elements of life]

{nucleosynthesis: fission: e.g.:  $^{40}\text{K}$ ; Cl/Ca, H/J}

Nucleosynthesis on the stability line (zone) is an further example.

In addition to the above, a further comparison of nuclear binding energy/nucleon reveals symmetry relative to their atomic mass number.

The said symmetry finds empirical support in the release of binding energy on fusion as well as by fission as a mass defect. Anyway are atoms, molecules and crystals being symmetric in his formation(s) and structure(s).

In other words, life should be also characterized by symmetry.

*Sigmoid functions as logistic and Gaussian normal curve with there corresponding distributions as well as nonlinear ODE and PDE (e.g.: stochastic ODE  $\sim$  logistic distribution; stochastic PDE  $\sim$  normal distribution) are suitable mathematical instruments for discover these symmetries among from others.*

*Furthermore could be manifolds (e.g. knot theory), algebraic differential geometry ( $\sim$  topology) and universal algebra an appropriate method in morphomatics for pattern formation and discrete systems etc.*

*Another way in general could be relations as symmetrical relations respectively associative operations as well as also their corresponding mappings (of sets) and set theory.*

### **Relation between symmetry and asymmetry**

The asymmetry described above suggests a change of life arts controlled by the laws of nature.

In the same way, the examples of symmetry indicate a further prerequisite for the basis of life governed by natural law - the necessary minimal stability with the correspondingly adequate minimal flexibility.

All the above features appear to imply an equally balanced (harmonic) relationship between symmetry and asymmetry like as for the (medium heavy) elements of life between the above remarks fusion-/fission-side.

e.g.:

1. The glassy sponge genus euplectella,
2. Each intra- and inter-structure/-distribution of elementsynthesis by isotops, isotons, isobars (mirror nuclides,...), magic numbers as well as nuclear binding energy curve,
3. fine-structure constant  $\alpha$ :  $1/85 / 1/180 = \text{equilibrium} \pm 10\% = 1/137$   
could be the reason why limits of protons fall apart by 1/85 respectively 1/180,
4. nuclear binding energy by equal/non equal numbers of n-p  
(CHO  $\sim$  CHON  $\sim$  CHONS  $\sim$  CHONSP),
5. stability line/ $\Delta$ stability line (zone) = stability zone  
e.g.:  $^{20}\text{Ca}/^{40}\text{K} = ^{20}\text{Ca} \sim N=Z (A=2Z) [\leq ^{20}\text{Ca}]/N \geq Z = N > Z (A > 2Z) [> ^{20}\text{Ca}]$ ,
6.  $\beta^-/\beta^+/\beta^-$  and  $\beta^+$ ,
7. atoms, molecules and crystals are dissymmetric in her structure(s) and formation(s) [ $\sim$  e.g.: chirality],
8. formation(s) and structure(s) of organism, species as well as genus,
9. spider silk: harder than steel/highly elastic.

*Suitable methods of exemplary research in that kind of relationships are (fuzzy) logistic compared to (fuzzy) log logistic respectively (fuzzy) normal with regard to (fuzzy) log normal functions and distributions as well as appropriate nonlinear ODE and PDE [e.g.: stochastic DE: P/O  $\sim$  distributions: normal/log logistic].*

*Furthermore could be nonlinear stochastic Schrödinger equations, evolution equations, dynamical equations, manifolds, abstract algebra, algebraic (diff.) geometry, topology*

*(e.g.: knot theory and loops), universal algebraic geometry (~ topology), braids, sheafs, moduln, pattern, simplexe, models, cluster, scenarios, Monte-Carlo methods respectively (computer) simulations and multiple-scale analysis with scale-invariant (scaling) functions for universal order parameter a suitable methods in origin, evolve, nature and aim for complexity as synergetic systems etc.*

*Another way in general could be relations as transitive relations respectively associative operations as well as also their corresponding mappings (of sets), set and category theory.*

This theory of life (ToL) could be defined as: attainment, maintenance and improvement of a dynamic symmetrical/asymmetrical structure in space and time at an increasing evolutionary level with the purpose of minimizing entropy in combination with simultaneous lowering of the dependency on negentropy.

Like an interdependent structurally symbiotic and dynamic equilibrium between symmetry and asymmetry is life.

This interrelationship is most clearly apparent at the  $^{56}\text{Fe}$  bifurcation point and the ratio between nuclear binding energy and energy release (~negentropy) on the symmetric side, and spontaneous symmetry-breakup also on the asymmetric side by phases crossing.

Further confirmation is shown by the distribution of life-essential elements, since all elements with an odd A in the Fermi statistics, i.e. asymmetric, and the remaining elements with an even A in the Bose statistics, i.e. symmetric, follow the pattern.

Finally, the 4 Maxwell equations are subdivided into 2 homogeneous (~symmetrical) and 2 inhomogeneous (~asymmetrical) equations, in the same way as the directly derived wave equations (Dirac) in a vacuum.

One effect of the explanations for these complex conditions above is reflected for example in the following formal relations of derivate equations (for further context see also point 4 appendix):

- a) Motions: Lagrange/Hamilton (~e.g. Ehrenfest-Theorem)
- b) Waves: Maxwell/Schrödinger
- c) Waves ~ particles: Schrödinger (boson)/Pauli (fermions) = de Broglie
- d) General motions: Lagrange/Hamilton
- e) General waves (wave packet): Gaussche wave packet/Schrödinger waves
- f) Systems: Ljapunov function(s)/Gauss-process(es)
- g) Ensemble: Gibbs/Gauss
- h) Statistic: Liouville/Von-Neumann
- i) Stochastic Processes: Langevin/Ito ~Chapman-Kolmogorov/Markov

Nature of life - in accordance with today's scientific research on life - contained possibly in this concept (ToL).

Example: actual data of deep impact mission (NASA)

A possible definition for life can be:

symmetry/asymmetry = symm.: quasi ~ dis = fuzzy  
~ stability/flexibility = relaxation

In this context a derive principle of life could read:

~ E: enthalpy/free enthalpy = free (Helmholtz)  
~ binding/free = internal

~periodic system: elements of life:

period (horizontal): non-metals/metals ~ non-metals/metals = half metals

~group (vertical) : metals/non-metals ~ sub/sub = trace elements

~ life: e.g.: period (5/1)/group (I $\Rightarrow$ VIII a-c) = II $\Leftrightarrow$ VII5 (diagonal)

~horizontal/vertical = diagonal ~ (flexible $\Leftarrow$ stable)/(stable $\Leftarrow$ flexible) = stable $\Leftrightarrow$ flexible

~special: non-metals + metals(ions): biological function:

[redox]catalysis/transport = stabilizers of structures + information carrier

e.g.: S, N + Fe, FeO, H, O, (Zn)/(H), SO + Fe, (Na, K), (Zn) = H, O + (Mg, Ca), (Zn)  
 ~coordination/transport = stabilizers of structures + information carrier  
 e.g.: C(~Si) HO: H/O = C (~ CHS: H/S = C)  
 ~ ↓  
 CHON: H, N/O = C (~ CHNS: H, N/S = C)  
 CHONS: N, S/H, O = C  
 CHONS P(~As): N, S/H, O = C, P(~As: Bacteria GFAJ-1)  
 SCHÖPFen: N/Fe, H, O, S = C, P  
 (~ 7 molecules: water, glucose, lecithin, tyrosine, ATP, oxyhäm, retinal)

### Medicine appears as a possible example of application!

Life's dynamic optimum seems to be found where symmetry and asymmetry are of equal probability [symmetry-/asymmetry gradient 50% ~ stability/flexibility ratio = 1 (~ e.g.: by stationary point)]. For example healthy life is approximately in the region of a 50% symmetry gradient with estimate  $\pm 10\%$  as a result of the self-maintenance processes of nature (~III. medium heavy nuclides).

In other words, around 45/55% or 55/45% are the limiting values (~ e.g.: by critical point) [*~ fluctuations tolerance level (threshold)*] for a minimally healthy life: for example medicine (Prophylaxis usually can be still effect here healing with self healing, e.g. homöopathy, ayurveda, dosimetry, dolorimeter (pain); *reversible damage far before exceed the tipping point for critical slowing down*  $< 0$ ). The progress of life (where its gradient is expressed as a dynamic ratio of optimal information to system) leads to a (log) logistic (~ sigmoid) function [ $y$  = probability,  $x$  = gradient: symmetry/t (~ asymmetry/t) [symmetry: quasi ~ dis = fuzzy]. For this reason, the upper and lower threshold value [*~ fluctuations tolerance level (threshold)*, e.g.: dosimetry, dolorimeter (pain)] is the minimum for a healthy existence, whereas life comes to an end above and under these saddle points. The course is progressive from the lower limiting value and degressive above the turning point, which is why optimization of the symmetry gradient [ $y = \Delta \text{probability} / x = \Delta \text{symmetry quality} / \Delta t$  (~  $\Delta \text{asymmetry quality} / \Delta t$ ) [ $\Delta \text{symmetry}$ : quasi ~ dis = fuzzy] leads to a higher degree of internal E for life (like for example increasing input of negentropy and output of entropy) the farer the above and below from the turning-point (~II. little > III. medium heavy nuclides, normally self healing through naturopathy is still possible). Over respectively under the turning point reach such live-saving processes until the saddle points [~I. great < IV. very light or very heavy nuclides, healing with complementary medicine (e.g. traditional chinese medicine/allopathy; *reversible damage before exceed the tipping point for critical slowing down*  $< 0$ ) still necessary because of the power of self healing ordinarily to weak already]. Outside this range, life itself comes fundamental to an end where the necessary structure and functions of this life are so irreversibly damaged that its essential processes are no longer possible (e.g. *irreversible damage to exceed the tipping point for critical slowing down*  $> 0$ ).

{explanations: e.g.: pain: scale: non  $\Rightarrow$  unconscious  $\Rightarrow$  threshold  $\Rightarrow$  conscious

~ threshold value: non  $\Rightarrow < 0 \Rightarrow \approx 0 \Rightarrow > 0$   
 ~  $\Rightarrow$  lower:  $< 0 \Rightarrow$  middle:  $\emptyset \Rightarrow$  upper:  $> 0$

~ turning point:  $\pm 10\% \Rightarrow \geq \Delta \pm 10\% \Rightarrow > \uparrow \pm 10\% \Rightarrow > \Delta \pm 10\%$

~ variation calculation: station.  $\Leftarrow$  Min.  $\Leftrightarrow$  middle:  $\emptyset \Rightarrow$  max.

~ saddle point:  $\Rightarrow$  lower ~ upper }

The curve itself reflects the probability of the energetic input expected if a certain degree of symmetry is to be attained. The highest probability for optimal life is located respective at symmetry/asymmetry gradient of around 50%. Life's optimum as expressed by the logistical curve (-equation) is analogous to life's gradient (symmetry gradient). The higher life's structural degree in each case, the higher its corresponding optimum horizontal in the said logistic curve as soon as also vertical and diagonal corresponding on a move over logistic curve(s). Each of those logistic curves reflects also another degree of complexity for the respective structure of life.

Alternatively expressed: life (commensurate necessary conditions-complex for a minimum capacity of relaxation/system) follow a normal distribution function  $\sim$ logistic function, e.g. genetics, thermodynamics, mechanics and so on ( $\sim\Omega$ ).

### 3 Resümee

Overall, this investigation showed that life could regular serves to optimize the avoidance, decline and exploitation of entropy with the purpose of increasing xýntropy over the corresponding decline in negentropy consumption. It seems to be that life follows the way of harmony with nature.

It is the immanent endeavor to attain perfection that drives life towards an ever higher degree of order on the evolutionary slope in order to overcome entropy.

Reduction of its negentropy and entropy dependence is demanded of life.

This can be an indication of mass $\sim$ information $\sim$ energy ( $m\sim I\sim E$ ):

general: waves: matter/ $E = I$  ( $\sim h/p/h\nu = \lambda$ )

$\sim$  special: spectrum: light: basic colors: red/blue = yellow

$\sim$  e.g.: stars: temperature: cooler/hot = quite a cooler

$\sim$  state: solid/gaseous = liquid

$\sim$  special e.g.: sun: spectrum: Fe/H = Na.

Both changes in the relative strength ratio of the interactive forces among each other, and elementary particle symmetry (particles/antiparticles) at  $t_0$  as compared with its later ( $t_{0+1}$ ) asymmetry, support the above statements

(These circumstances are different when referring to positive (+) and negative (-) charged particles - proton/electron - where antisymmetry is referred to on account of their charge).

General principle of life therefore looks like normally a harmonic interaction between stability (symmetry) and flexibility (asymmetry), an partial open dynamic structure assisted by a symmetry/asymmetry process of equilibrium/equilibration, itself directed towards increasing xýntropy. In its entirety, this consists of a "universal dynamic enhancement of life's quality in combination with an increasing degree of complexity": especially by relaxation, for a symbiotic system/environmental maintenance or improvement - e.g. via stability/instability, unity/multitude, selection/variation, epigenetic/genetic, parity/chiral and sunspot cycle. Hence life corresponds in general to a Gauss process. Reaching life's optimum ( $\Omega = 1$ ): has a probability of 50% (symmetric/asymmetric), i.e. life loses its equilibrium below this point and the demands of self-healing mechanisms increase.

As a result, natural phenomena generally show a normal Gaussian distribution.

This indicates that life is basically the search for a dynamic optimal equilibrium between stability and flexibility with a view to minimizing entropy (disorder) by means of a corresponding symmetric/asymmetric harmonization.

As a consequence of my findings, I recommend that presumption:

Evolut. = Increase (degree of) complexity and raised so the number of the degrees of: invariant freedom/variant bond = interaction for a s.

$\sim$  Life = Living s can be self regulated change his number of the degrees of: invariant freedom/variant bond = interaction.

$\sim$  Natural synthesis = Living s can be self regulated raised his number of the degrees of: invariant freedom/variant bond = interaction.

**Consequence: The more complex the more degrees of: invariant freedom/variant bond = interaction.**

$\sim$  General: Nature ( $\sim$  Bios) [ $\sim$  Culture]: Complexity by [(variant: In/+ =  $\pm$ ) based on the relationship between a number/quality = Güte degrees of: (freedom/bond = interaction)] {stationary: opt.: universal eternal all-best well}

$\sim$  (a)bio(genesis) = positive  $\Delta$  from quantities of number and quality by interaction intra and between degrees of (in)variant freedom/bond = complexity {e.g.:  $\uparrow$ positive Gütegrad of: freedom/bond = complexity  $\sim \uparrow$ symbiose

( $\sim$  mutual.) [ $\sim$  altruist.]  $\Rightarrow$  freedom/ $\uparrow$ bond =  $\uparrow$ complexity  $\sim \uparrow$ bond  $\Rightarrow \downarrow$ chance ( $\sim \uparrow$ probability)  $\Rightarrow \downarrow S \sim I$  (need)}

$\Downarrow$

Evolution go step by step a nature way of life ( $\sim\Omega\leq 1$ ) as a complementary interaction process with each other between symm. and asymm. by symmetry-breakup: physical  $\Rightarrow$  chemical (prebiot.) + prebiol.  $\Rightarrow$  biologica [reverse evolution:  $\Omega \rightarrow 0$  or  $>1$ ]

Example: nucleons  $\Rightarrow$  crystallization, (quantum) crystals, crystalloide, crystalline proteins, protein crystals, (bio) molecules (monomere: nucleotide...), biocrystals, carbon, virus (Mimiviridae, Mamaviridae, Sputnik)  $\Rightarrow$  protobionts (eobionts), prokaryots (archaeas + bacteria), eukaryots [algae, corals, plankton), ctenophora (mertensia ovum...), sponges (glassy sponge...)]

$\sim$  natural genesis: physico (cosmochemistry)  $\Rightarrow$  chemo (stereochemical) + abiot. (abiogen)  $\Rightarrow$  bio.

Example: elements  $\Rightarrow$  nucleotide, biomats  $\Rightarrow$  photo, (bio) macromolecules [(bio)polymere] (rna, dna, haemoglobin, little proteins, amino acids, carbon,...).

Suitable methods for measurement the following quantities and qualities of life is possible  
e.g. by spectroscopy, spectralanalysis, frequency comb, theories of density  
functional/wave functional.

## 4 Appendix

$I/II = III$  (Diagonal)  $\sim a/i = e/c/g = e \Rightarrow Ie/IIe = 1 \sim d/f = e/b/h = e \Rightarrow Ie/IIe = 1 \sim \text{Lifeopt. } (\sim \Omega)$   
 $\Downarrow$   $\Downarrow$

Examples: Dirac notation:  $\delta$  function/ $\delta$  distribution = Dirac eq.  $\sim II1-I2/II3-I2 = II2-I2$   $e^{i\pi} + \Omega = 0$

III Example II	I discrete 1	singular-continuous $\sim$ discrete-continuous 2	continuous 3
d e t e r m i n.	Liapunov funct.  Schrödinger eq.  <i>a</i>	Fractals: Cantor's set  <i>b</i>	Schrödinger wave function transport eq.  <i>c</i>

<div>deterministic</div> <div>2</div> <div>chaos</div>	<div>Liapunov funct.</div> <div>Schrödinger eq.</div> <div>Schrödinger wave packet (group)</div> <div>d</div>	<div>Dirac notation: <math>\delta</math> function <math>\sim \delta</math> distribution</div> <div>example: QM: particle/wave = complementary</div> <div><math>\Downarrow</math></div> <div><math>\Pi 1 - I2 / \Pi 3 - I2 = \Pi 2 - I2</math></div> <div><math>\Downarrow</math> <math>\delta</math> function (<math>\sim \delta</math> distribution):</div> <div>aleatory variable: I2</div> <div><math>\Downarrow</math> examples:</div> <div>quantum mechanics (QM): particle <math>\sim</math> wave</div> <div>Schrödinger eq.</div> <div>Q Chaos: Q billard</div> <div>Gaussian ensemble</div> <div>logistic process</div> <div>e</div> <div>steady state</div> <div>bifurcation <math>\sim</math> symmetry breaking</div> <div>complexity</div> <div>approximation</div> <div>eq.: Fokker-Planck <math>\sim</math> integro-differential <math>\sim</math> evolution</div> <div>e.g.: synergetics</div> <div>emergence: e.g. Q thermodynamics:</div> <div>thermodynamic limit (lim):</div> <div>phase transition (e.g. by <math>z = \text{real } 1</math> on unit circle)</div> <div><math>\sim</math> symmetry breakings</div> <div><math>\sim</math> algebraic Q theory</div> <div>multifractal:</div> <div><math>I2</math> (Cantor distrib. fct.)/<math>I2</math> (fractals spectra) = <math>\Pi 2</math></div> <div>local theory/global theory = canonical set</div> <div>spectral/partition function = partition function</div> <div><math>\sim</math> " dto. / " dto. = generalized (equilibrium-) set</div> <div><math>\Updownarrow \sim c = G = \hbar = h = k = e = \alpha = 1</math> (<math>\sim \Omega</math>)</div> <div><math>\sim</math> group theory: group/semigroup = quasigroup</div> <div>(<math>\sim</math> QFT: general/canonical field quantis. = effective)</div> <div><math>\sim</math> topological: group/semigroup = gruppoid</div> <div><math>\sim</math> manifold: group/semigroup = gruppoid</div> <div><math>\sim</math> e.g.: dynamical: equations <math>\Downarrow \sim</math> systems</div> <div><math>\sim</math> group/topological = manifold</div> <div>vibrating: particle/wave = particle <math>\sim</math> wave</div> <div>(opt.: particle <math>\approx</math> wave) [<math>\sim</math> e.g.: loops/strings =</div> <div>vibrating particle <math>\approx</math> standing (stationary) wave]</div> <div><math>P(\emptyset) = \{\emptyset\} \Leftrightarrow \text{zero-point} \Leftrightarrow m \sim I \sim E \Rightarrow E = m/I</math></div>	<div>heat conduction eq.</div> <div>f</div>
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s t o c h a s t i c	3	Liapunov funct.		Wiener Process (Brownian motion)
		Schrödinger eq.	$\delta$ -distribution	
		$g$	$h$	$i$
		Fokker-Planck eq.	Schrödinger eq.	Schrödinger eq.
		Pauli eq. (master eq. in the strict sense ~ Paulische master eq.)	fractals: fractional Brownian motion  fractal growth  state process(es) [e.g.: Markov process]	reaction diffusion eq.  functional Fokker-Planck eq. functional master eq.  generalized master eq. (~ generalized Paulische master eq.)

Table: enlarged: **I2** quasi-/II2 semi-dimensions  
generalized:  $\beta$ : Information/Communication =  $I \sim C$   
(~ informative Communication/communicative Information =  $iC \sim cI$ )  
e.g.: chromosomes: (selection:  $\Delta: XX/Xy = 0$ )/(variation:  $XX/Xy = XXy$ ) = mutation  $XXy$   
~ reproduction: sex.:  $+/a = \text{inter}$  (~ trans):  $Xy/XX = \text{androgyn}$  ( $XX\text{-man} \sim Xy\text{-women}$ ) [~ meta:  $\beta$ :  $(i)y/x = z$ ] {stationary: opt.:  $XXy$ }

The formal quintessence of this theory could be read probably ~ in the relevant context of following relations:

Fundamental: environment (e)/system (s)/s/e = s-e  
~ e.g.: biol.: genet./epigenet. = transposable elements  
~ s: transformation/regeneration = complementarity  
[~ lock-and-key principle (~ hand in the glove principle)]

Logic: classical/many-valued = fuzzy

Abstract: folding: commutative/distributive = associative ~discrete/distributions = halfgroup.

Special: general sinus function (harmonic function)/log normal distribution = logistic function(s)

~ General: functions/distributions = equations (eq.)

~ Special: Liapunov/ $\delta$  = Schrödinger

Example:  $\delta$  distributions: discrete/continuous = singular continuous

Schrödinger equations (atomic): deterministic/stochastic = deterministic chaos  
~ reversible/parabolic = stationary

Liapunov functions: deterministic/stochastic = deterministic chaos

Entropy fct./Schrödinger eq.[free E (negative relative entropy) ~ exergy] = fuzzy entropy

~ Principles: General: action: least (special: classic)/least (generalized: QT) = opt. ~ stationary (general)

~ Special: Hamilton's/of the least action = of least action of Hamilton (~ mathe: stationary action)

~ Euler-Maupertuis/of detailed balance = of least constraint (Gauss)

~ (partial) open systems: internal:

max. information(rise)/min. entropy production (Prigogine) = stationary (opt. = 1)

~ Physics: classical/quantum = complementary (classical-quantum...)

Example: Schrödinger eq.: determin./statistic = probability ~ revers./parabolic = stationary

~ Quantum: biology/physics = chemistry

~ Thermodynamics: classical/irreversible = statistic (Schrödinger) ~ (Gibbs)

~ e.g.: equilibrium: thermodynamic/non = steady state (~ flow)

~ Nature: processes: I deterministic/stochastic = deterministic chaos

~ II revers./irrevers. = stationary  $\Rightarrow$  rough: eq.: hyperbolic/parabolic = elliptic

~ Processes: reaction diffusion/transport = relaxation

Example: Schrödinger eq. (I ~ II) for: waves/diffusion (~conduction of heat) = conduction of heat

wave function: general: state function/state vector = probability wave

special: wave packet (group)/wave = Ritzian variation principle

~ psi ( $\Psi$ ) function/Schrödinger wave = Schrödinger function

Liapunov funktion: (I) for limited growth:

Lotka Volterra/diffusion~Brownian motion (~fractals) = Verhulst

II linear partial differential eq.: waves/diffusion = Laplace

Fractals: dimension: determin./variate = multi

Applications: dynamic systems: deterministic/stochastic = deterministic chaos

Spectral theory: spectra: discrete/continuous = singular continuous

~ Probability theory: distribut.: dto. (= multifractals dim.)

General sets: equilibrium/non equilibrium = generalized (multifractals)

~ Example: Para/Green = Gibbs

~ Special: statistical physics of equilibrium-system: Boltzmann/Q = Gibbs-distribution

System in non-equilibrium: Q-Statistics: Kinetic: correlation/Green = phase space

~example: symm./transport = partition function

~ Nucleogenesis ~ elementsynthesis: boson/fermion = quasi particle

~ statistics: Bose-Einstein/Fermi-Dirac = quasi particle

~ e.g.: spin:  $1/2 = 0$  [~ nuclear spin]

~ physics: quantum (photon)/electron = meson [~  ${}^2\text{H}/{}^{17}\text{O} = {}^{12}\text{C}$ ]  
gluon/lepton ~ quark = Higgs

(~ vector boson/fermion = scalar boson (~quasi boson)

[~ e.g.:  ${}^2\text{H}/{}^{17}\text{O} = {}^{12}\text{C}$  (earth) ~  $\text{H}_2/{}^{13}\text{C}$  (cosmos) =  ${}^{16}\text{O}$ ]

~ bond: atomar: metallic/non-metallic = ionic

~ chemical: [CHO: C/O = H]

~ biomolecules: funct. groups: carbonyl/hydroxyl = carboxyl  
 e.g.: hydrogen bridge bond  
 low-molecular precursor:  $\text{H}_2\text{O}/\text{CO}_2 = \text{CHO}$   
 ~ bond: electrostatic attraction/strong = weak  
 ~ compounds: polar/apolar = intermediate  
 first order/higher-order = intermediate

~ Sets (ensemble): Gibbs distribution:

microcanon./grandcanon. [partition function (chem.)  $\Leftarrow$  Schrödinger eq.] = canon. [dto.]

~ Gaussian Ensemble: orthogonal (GOE)/unitarian (GUE) = symplectic (GSE)

~ Distributions:  $\delta/\delta = \delta$  (Dirac's delta)

~ standard normal/normal

~ special: hypergeom./ $\Gamma$  = exponent, ~ (standard) logistic

~ Example: basic function  $F[\text{Re}(z) > 1/2]/-\Gamma'(1) = \gamma (=0,57\dots)$

~ B bin./log.  $\Gamma = F \sim \text{bin.}/\log.$  normal = standard normal

~ Poisson/log. log. = log. in connection with Liapunov exponent

~ Functions: general: algebraic/transzendental = hypergeometric ~ e.g.: polynomial/ $\Gamma \dots = F$

~  $\delta/\delta = \delta$  ~see distribution: dto. ~  $B/\Gamma$  (~special:  $\zeta$ ) = fuzzy ~...see distribution: dto.

~ Example for optimum: Riemann's  $\zeta$  (Zeta) function: real part = 0,5 ( $s = 0,5 + it$ ) ~  $\text{Re } z = 0,5$

[~ e.g.: theory of numbers (distribution of prime numbers): Riemann's conjecture (hypothesis)

Statistical physics: special partition function]

~ Arithmetic:  $\mathbb{N}$ : even/uneven (odd) = prime [= zeros = waves (graph of a vibrated sinus function) ~ Riemann's  $\zeta$  (Zeta) function:  
 e.g.: physics: special partition function (statistical), renormalization theory, cosmic microwave background (CMB)]

~ Riemann's  $\zeta$  (Zeta) function: prime numbers = zeros = waves (sinusoidal) = unit of arithmetic

e.g.: logic: number theory/geometry = analysis

~ probability: ordered zeros/quantum physics = random prime numbers (~ waves)

~ arithmetic: combinatoric/geometry = probability, serial theory

atoms (elements) of arithmetic = prime numbers system

{ ~ atoms (elements) of chemistry = periodic system

[~ atoms (elements) of physics = elementary particles system]

e.g.: elements of life ~ prime numbers ~ natural elements

[e.g.: E: association/binding (curve) = cohesive

~ crystallography/atomic and molecular physics (nuclear  
 physics) = solid-state physics, physical chemistry

binding: spectral lines of hydrogen: quantum numbers:

hydrogen atom: ideal (Balmer)/real (experience)

~ numbers: integer/rational = real

particle/waves = quantum waves resonance]]

$\zeta: (z \sim s)/(x) = (1/2 + it) \sim it/1/2 = 1/2 + it \sim 0/1/2 = 1/2 + 0 = 1/2$  ~ numbers:  $\mathbb{C}/\mathbb{R} = \mathbb{R} + \mathbb{C}$

Riemann-Siegel theta function: Gram point ~ Gram's law:  $e^{i\theta(t)}/e^{i\theta(t)} = e^{-i\theta(t)} + e^{i\theta(t)} = 0$

~ unit circle: i axis: e.g.:  $-1 + 1 \sim < -i/2 + > i/2$

(~  $e^{in\theta(t)}/e^{in\theta(t)} = e^{-in\theta(t)} + e^{in\theta(t)} = 0$ ) [~ Mill's constant  $\theta$ ]

~ Number theory: prime numbers: uneven/uneven = even ~ e.g.: multiple of 4+1/multiple of 4-1 = 2 (~ prime pair)

[~ dimensionless constant:  $\approx \alpha^{-1}/\approx \alpha = 1/\alpha^2 \sim \sqrt{5}/\sqrt{3} = \sqrt{2}$  ~ Fibonacci:  $5/3 = 2$ ]

~ even/uneven = both ~ e.g.:  $2/3 = 2 + 3$

~ Goldbach's conjecture:  $n > 2/n > 5 = n < 4$  [ $2+3 = 5$  (~ relatively prime number)]

~ Numbers: special: quaternion/complex = fuzzy ~ imaginary/real = many-valued

~ general: hypercomplex/hyperreal = super [~ Clifford algebra/non-standard analysis (Robinson) = Graßmann algebra]

~ generalized: super/many-valued = fuzzy

~ geometry: plane/line = space

{ ~ e.g.: circle/circumference = (division) ring [non-commutative] ~ circular ring/curve = ball ~ dim.:  $2/1 = 3$   
 ~ numbers: complex/real = multidimensional (many-valued)  
 ~ Riemann: conjecture (special partition function ~ sphere):  $it/1/2 = \zeta$  function  
 (~ e.g.: physics: scheme: E-level ~ term; Q chaos ~ thermodyn. ~ dim.: I ~ fractal) }

~ Analysis: equation(s)[system of:] integral/differential = integro-differential

~ Group theory: group/semigroup = quasigroup

~ Example: dynamic systems: flows/semiflows = viscous fluids (by Navier-Stokes)  
 (~one-parameter groups/halfgroups = strange attractors with one broken dimension)  
 discrete/continuous = singular continuous ~ flow/(half)flows = discrete fluids  
 t-dependency processes: revers./irrevers. = chaotic behaviour (turbulence)

~ Topological: group/semigroup = groupoid

~ Manifold: group/semigroup = groupoid

~ Example: ergodic theory: dynamic group/semigroup = groupoid

~ Differential geometry: group/topologic = manifold ~ example: interactions

~ Topological: differential: group/algebra = manifolds  
 exactly sequences: homology/cohomology = homotopy  
 (~ groups: homologic/cohomologic: arbitrary coefficients: is called universal coefficient theorem)

~ Manifold: differential/topological space = topological

~ Algebra: geometry: group/topology = manifolds

~ Space: topological/geometrical = manifolds

~ e.g.: unit: sphere (S): circle/surface = ball ~  $S^1/S^{n-1} = S^2 \sim \mathbb{R}^2/\mathbb{R}^n$  (~ special: topological  $\mathbb{R} = \mathbb{R}^3$ )

~ Riemann surface/Riemann sheets (compact Riemann surface) = topological unit ball  $S^2$   
 (~Riemann sphere) ~  $z/w = s^2$

{ ~  $x^2 + y^2 = 1$  ( $x = y = 1/\sqrt{2}$ ) /  $x^2 + y^2 + z^2 + w^2 = 1$  ( $x = y = z = w = 1/\sqrt{4}$ ) =  $x^2 + y^2 + z^2 = 1$  ( $x = y = z = 1/\sqrt{3}$ )  
 [y = symmetry, x = asymmetry, z = symmetry: quasi ~ dis = fuzzy, w = symmetry breaking (~ phase transition),  
 1 = spontaneous symmetry breaking (~ bifurcation)] }

~ Super: mathematics: numbers: algebra/geometry = analysis ~ e.g.: physics: symm. [Grossmann (generalized Hamilton)]:  
 Lie (-groups)/manifold = positions principle

~ Algebra: elementary/abstract ~ numbers/(super)complex numbers ~ quantity/quality  
 ~ e.g.:  
 algebra: combinatorial/multilinear = (diff.) topology (geometry) [~ e.g.: schemes]  
 { Weyl (representation theory)/[Lie (Kac-Moody)] = Grothendieck  
 ~ structures: rings/groups = body }  
 ~ physics: loops (spin network)/strings = ball

~ Borchers: monster symm. (groups) ~ modular function (number theory, Fourier: coefficient, series)/string theory = vertex algebra  
 ~ groups: discrete/continuous = infinite dim.

[~ e.g.: finite simple (sporadic: Monster,...)/Lie (O, SO, U, SU,...) = loop ~ Infinite (modular,...)/Lorentz, Poincaré = quantum  
 ~ other finite (symm,...)/symplectic = diffeomorphism  
 ~ finite/infinite = abelian  
 (~ e.g.: sporadic/Lie = rings, body,...)

~ dimension:  $1/2 = 3$  ~ figures: circumference/surface = ball (~regular polyeder: icosahedral: e.g.: virus)  
 ~ topology: circumference (knot)/circle = ball ~ figures: rings/rings = body ~ G: strong/weak

{ ~ Leibniz: combinatorial (symbolic logic)/infinitesimal calculation ~ synthetic/analysis = combinatorial analysis  
 e.g.: geometry: analytic/algebraic ~ Descartes/Leibniz }

~ Mathematics: discrete: combinatorial: algebra/geometry (~ topology) = analysis  
 ~ e.g.:  
 ringtheory/sets (~ theory of knot groups) = objects or structures (graphs [probability], networks, ...)

~ Diff. geom. (curvature, topology + analysis): principal bundle: curves: plane/plane = sphere  
 ~ e.g.:  
 physics: loops/strings = ball

~ mathematics: graphs/fibre bundle = bundle ~ spin network/fibre = sheaf  
 ~ homeomorph: diffeomorph/de Rham's cohomology = sheaf cohomology

~ Geometry: diff./algebraic = algebraic diff.  
 ~ e.g.:

Theory of everything (TOE): supersymm.: supergrav./superstring theory = E10-algebraic (supergrav. + string theory)  
 ~ Unified field theories (UFT): canonic/QFT ~ Quantum gravity (QG)/TOE (AdS/CFT-duality: superstrings/QFT)  
 ~ loop/string theory ~ causal dynamical triangulation/M-theory

~ topology: set theory (diff.) / algebraic (e.g.: triangulation) = algebraic diff.  
 ~ e.g.:

Theories of gravitation (TOG):  
 Unified field theories (UFT): e.g.: QG/TOE = Q topology (geometry ~ QGD)  
 ~ circle/circle = ball (~ homeomorph: regular polyeder: dodecahedral)

~ duality: e.g.: symm.: regular polyeder: icosahedral ~ dodecahedral

~ representation (theory):  
 e.g.:

algebra/geometry = generalizes Fourier analysis via harmonic analysis  
 (~ number theory via automorphic forms and Langlands program/geometry via invariant theory and Erlangen program)  
 diff. geometry (~ analytic number theory) / algebraic geometry (~ topology) = module theory

~ Geometry: algebraic/topological = analytic ~ synthetic

~ special: Lie: orthogonal/unitarian = symplectic

~ e.g.: conformal/Kähler = Kähler manifolds

~ quantum geometry: Riemannian/standard = geometrodynamics (QGD) [eq.: Wheeler-DeWitt ~ Schrödinger]

~ quantum gravity: spin (~ loop)/string = canonical quantum gravity ~ non-commutative

~ interactive forces: electro(QED)weak/strong (QCD) = GUT ~  $\alpha: \alpha/\alpha_w/\alpha_s = \alpha_{\text{GUT}} \sim \alpha_g/\alpha_{\text{GUT}} = \alpha_{\text{TOE}}$   
 [~ dimensionless constants:  $G/\hbar = c \sim \alpha_G/\alpha_s = \alpha$  (~  $G/\hbar = k \sim e \sim$  gravity:  $G/\alpha_G = F$ )  
 ~ Planck:  $\hbar = k = e = c = f(G) = 1$ ]

{~ dimensionless constants (~ only conversion factors):

$E = mc^2$  (c transform E in m)

~  $E = h\nu$  (h transform E in  $\nu$ )

~  $E = hR$  (h transform E in R)

~  $E = kT$  (k transform E in T)

~  $R_s = 2GM/c^2$  (G transform m in l, namely in Schwarzschild radius

~ Compton wave length ( $\lambda_c = h/mc$ ): mini black hole  $\Rightarrow (\lambda_c \sim R_s)$   
 as a measurement for thermometer, clock + scale]}

e.g.: spin:  $1/2 = 0$  ~ TOE: GUT/gravitation = Higgs (~ boson: vector/tensor = scalar)

~ general: point/plane = line ~ special: point/sets = point set ~ sets point

~ forces: equilibrium: gravity/nuclear = centrifugal (~ e.g.: generalised)

~ UT: Geometry/probability = (fuzzy) fractal geometry  
 e.g.:

$ART/QT = QGT$  (quantum geometry theory)

{~ super: symm./asymm. = fuzzy fractal symm.

[~ e.g.: physics: super: gravitation/space ~ Witten/Wheeler

~ mathematics: differential Geometry/variable topology = algebraic differential topology (~ geometry)

~ medium: e.g.: ether: gravitation/quantum = vacuum (~ zero-point field: emergence, intention)]}

~ space ~ t:  $n/\infty = \rightarrow 0$  ( $\sim \infty$ )

~ t: epoch/period = space/t

~ metric: cosmos:  $\Omega: >1/<1 \approx 1$

~ e.g.: galaxies: elliptical/spiral = disk (e.g. barred spiral ~ Milky Way)

curvature: body  $\sim t/\text{space} = t = \text{body} \sim \text{space} \sim t$   
 $\sim$  e.g.: eq.: Lorentz contraction/gravitational lens effect = Friedman-Lemaître (F-L)  
 $\sim$  scales (coordinates)/objects = quantities  
 $\sim mv^2 (\sqrt{1-\beta^2})/c = mv$

$\sim$  cosmology: models: singularity: +/non = quasi  
 $\sim$  e.g.: F-L (standard)/(quasi) steady state (F-L) = evolutionary (stationary) [quasi cosmological principle, cosmic microwave background (CMB) radiation (CMBR), Doppler effect [red shift:  $z = \Delta\lambda/\lambda = v$  (relative)/c], Hubble('s) law (constant), nucleosynthesis, Sagnac effect), fuzzy steady state]

$\sim$  quantity (type)  $\sim$  units  $\sim$  nature constants:  $m/E = I \sim \text{kg/J} = \text{J/K} \sim m_p/hR = k (\sim S)$

$\sim$  e.g.: Planck:  $m/E = T$   
 $\sim$  fundamental quantity:  $m/q = T \sim$  basic units:  $\text{kg/As} (C) = K \sim$  nature constants:  $m/e = T$   
 $\sim$  Coulomb-: Pot.:  $F (\text{law})/E = \text{interaction}$  [measurement  $A: e/s$ ]  
 $\sim$  quantity:  $e/hR = \text{partition function} \sim \text{Coulomb/Rydberg} = \text{Gibbs}$

$\sim$  fundamental interactions: basic forces:  $G/\text{strong} = \text{electroweak}$

$\sim$  e.g.: charges  $\sim$  coupling constants ( $\sim$  universal coupling):  $G/g_s = g \sim$  fine structure constants:  $\alpha_G/\alpha_s = \alpha - \alpha_w$

$\sim$  charges/ coupling constants ( $\sim$  universal coupling) = fine structure constants:  $e = g \sin \theta_w/g = \alpha_{\text{TOE}}$

$\sim$  quantity:  $E: \text{Einstein/Planck} = \text{Boltzmann} \sim$  physics: Classical/ $Q = \text{Thermodynamics} \sim mc^2/hv = kT \sim m/E = I$   
 $\sim$  e.g.: water: aggregation states: solid/plasma ( $\sim$  gas) = fluid ( $\sim$  opt. = triple point:  $m \approx I \approx E$ )  
 $\sim$  phase boundary:  $m \sim I/I \sim E$  ( $\sim$  critical point:  $m = E \sim m = I \sim I = E$ ) =  $m \sim E$ ]

$E/S$ : radiation laws: Rayleigh-Jeans/Wien = Planck  $\sim$  exponential function ( $e^x$ ):  $e^{hv/kT}$

$\sim$  particle/waves:  $m \sim E: hc/\lambda: mc^2/hv \sim \text{Compton/De Broglie} = 1$  (Compton  $\sim$  De Broglie)

$\sim$  Compton(-Effect):  $(\Delta)\lambda = h/mc \sim p = hv/c$  ( $Ns = \text{kgm/s}$ )

$\sim$  De Broglie:  $h/\lambda = p$  ( $\sim \lambda = h/p \sim h/mv$ )

$\sim$  particle  $\sim$  waves:  $E \sim m$ : complementarity:  $hc/\lambda/p (=h/\lambda) = c$  ( $\sim v$ ) =  $v = \lambda v = \lambda/T \sim hc/\lambda/p (=hv/c) = m/s$

$\sim E/h/\lambda \sim E\lambda/h$  ( $\sim m/s$ )  $\sim E/p$

$\sim hc/\lambda/\lambda (=h/mc) = ma$  ( $\text{kgm/s}^2$ )  $\sim \lambda^2/hc = ma$

$\sim$  particle/wave = field:  $m \sim E \sim F \equiv I: hv/ma = \lambda_{\text{th}} \sim k$  ( $\sim J = \text{Nm/N} = \text{J/K} \sim \text{Nm/K} \sim \text{N}\lambda/\text{K}$ )

$[\lambda_{\text{th}}: \text{thermal De Broglie wavelength} \sim (\text{mean}) \text{ De Broglie wavelength } (\lambda = h/p): p = mv = \text{root of } 3mkT]$

$\sim$  partition function  $\sim \lambda = h/p$  ( $\sim J_s = \text{Nms/Ns} \sim m = \text{kgm}^2/\text{s/J}_s$ )  $\sim p\lambda/p$

$\sim$  e.g.: photon/de Broglie (matter) wave [ $\sim$  probability wave (Schrödinger wave function)]  
 $=$  field quantum/quantum field ( $\sim$  quantum space) [ $\sim$  QED]  $\sim$  eq.: Heisenberg/Schrödinger = Pauli

$\sim$  matter (wave  $\sim$  particle:  $E \sim m$ ): of motion ( $>0$ )/rest ( $=0$ ) = quantum ( $\geq 0$ )

$\sim$  matter: wave/particle = wave  $\sim$  particle  $\sim$  e.g.: motion/rest = standing wave ( $c = \lambda v$ )

$\sim$  reality/potentialities = probability: matter/ $I = \text{space}/t \sim$  e.g.:  $hRv/kT = \lambda v$

$\sim E \sim m/k = c$  ( $\sim v$ ) [length/duration]  $\sim$  units:  $J \sim \text{kg/J/K} = m/s$   
[measurements:  $h/\Delta kT = c$  ( $\sim v$ )/ $R_\infty$   $\sim$  units:  $J_s/\Delta J = m/s/m^{-1}$ ]

(~ alternative:  $h/kT/R_\infty \sim \text{units: s/m}^{-1}$  or  $v/\lambda \sim \text{units: s}^{-1}/\text{m}$ )

~ Leibniz:  $\int mv \, ds = \int mv^2 \, dt = A = \text{extr.}$

~ Leibniz/Newton = Euler-Maupertuis  $\sim mv^2 + 2gh = \text{const.}/\Delta(mv) = \int mv \, ds = \text{extr.}$

~ Hamilton =  $\int L \, dt = \text{extr.} = \text{min.}$  (principle of the least action)  $[Et = h \, (Js)]$

{~ Prigogine's theorem (principle of minimum entropy production):  $P = diS/dt = \text{min.}$

~ extension: Prigogine/Glansdorff (principle of evolution:  $d_x P$ )

~ principle of optimal use:  $S/-S = \text{opt.}$  ( $\sim k/-k$ )  $[J/K/J/K \, (\text{temp.} = K \approx \Delta kT = J/\Delta J \cdot J/\Delta J = \text{opt.})]$

(~ max. exergy: max. energetic degree of action/expenditure = opt. energetical degree of use)

[~ necessary need of max. exergy: max. action/min. expenditure = equilibrium]

~ space  $\cdot$  t :  $R_\infty v \, (1/\text{ms})$

~ space/t:  $\lambda v \, (\text{m/s})$

~  $\alpha_{s-t}$  (space~t):  $\text{space}/t/\text{space} \cdot t = t\text{-space}/\text{space-t} \, [(\sim \text{m/s}/1/\text{ms} = \text{m}^2)/(\text{m/s}/\text{ms} = 1/\text{s}^2) = \text{m}^2/\text{s}^2]$

~ location  $\cdot$  momentum/space  $\cdot$  t ( $\sim \text{mNs/ms} \sim Et/\text{ms} \sim h/\text{ms} \sim J/\text{m}$ ) = F (N)

~ principle of least friction : matter  $\sim I/\alpha_{s-t} = \text{extr.} = \text{min.}$  ( $J \sim J/\alpha_{s-t}$ )  $\sim hv \, (\sim hc/\lambda)/kT/\alpha_{s-t} \, (J/J/\alpha_{s-t})$

$\sim (\text{m/s}^2/\text{m} \cdot \text{m}^2 = \text{m}^2/\text{s}^2 \sim \text{kg/s}^2/\text{kg/m}^2 = \text{space}/t \sim \text{m/s} = v)$

~ energy: thermal/kinetic/ $\text{m}^2/\text{s}^2$  ( $v^2 \sim c^2$ )  $\sim E/\text{velocity}^2 = m \, (\text{kg})$

~ quant (e.g. : photon)

[~ Rydberg ( $hR$ )/Planck ( $E_p$ )/ $\alpha_{s-t}$ ]

{~ way of the least resistance ( $\sim \text{min.}$  "nasty")}

~ e.g.: cybernetics: natural control circuit

~ physics:  $QT/RT = \text{TOE} \sim \text{e.g.: singularity (black holes)/quantum vacuum} = \text{singularity-Q vacuum}$

~ mathematics: QFT:  $RT/QT$ : e.g.: general/canonical = QED  $\sim \text{algebraical/Euklid.} = \text{effective}$

[algebraical ( $\sim \text{e.g. axiomatical}$ )/canonical field quantisation

~ topological/Euklid.  $\sim \text{general} \, (\sim \text{e.g. algebraical})/\text{effective} = \text{QED}]$

~ special: Schrödinger: generalized (Dirac + Klein-Gordon)/generalized (Pauli) = QED

~ General principle of life: principle of: optimal use/least friction =  $H\Psi = E\Psi \, (J) \sim \text{stationary (turning point)}$

[~ Ritzian variation principle: solution for  $H\Psi(x) = E\Psi(x)$  to definition Schrödinger wave function  $\Psi(x)$ ]

~ e.g.: principle: max. action/min. expenditure = equilibrium  $\sim \text{extr. (probability density function } \Psi)$

$[\sim h \, (\sim \text{momentum/length})/hv/v \sim Et/E/(m/t) = m \sim \lambda_{th} \, (\sim \lambda = h/p) \sim \text{harmonic (sinus) wave} \sim R_\infty]$

~ effectivity/efficient = opt.

~ e s/s e = s e/s e/e s = e s = symbiotical opt. (s-e)

~ Special principle of life:  $m/E = I$ : degree of: max. (possible) action/min. (necessary) expenditure = opt. use

~ e.g.: principle of: S ( $\sim \text{organical growth}$ )

E: (Leibniz: greatest action/least expenditure) = Hamilton

action/agens ( $\sim \text{action}$ )  $\sim \text{e.g.: } hv/h \, (\sim J/Js)$

~ E: bound/free = internal ( $U$ )  $\sim \text{rest/motion} = \text{equilibrium} \, [\sim \text{min. (relative necessary): action/expenditure} = \text{opt.}]$

~ (opt.) efficiency/(opt.) use level = interaction level

e.g.: interaction: special: coefficient: number/parameter = factor (stationary: opt. = 1)

general: level/term = principle

{bound (~ m): enthalpy  $H$  (Gibbs)/thermal  $Q$ /pot. [exergy  $W_E$  (useful)]/rest [hv (quantum)] = efficiency  
~ (degree of): action/expenditure = opt.}

{free: enthalpy  $G$  (Gibbs)[min.]/(~ Helmholtz  $F$ )/thermal  $Q$ [min.]/kin. [exergy  $W_E$  (useful)]/motion [hv (quantum)] = use level  
~ (degree of): action/expenditure = opt.}

~ thermal  $E \sim E$ : bound/free ~ anergy/exergy ~ kin./pot. ~ motion/rest ~ vector/scalar  
~ e.g.: substance: photon hv (quantum) [ $\sim kT$ , hR, mv]

~ (degree of): action/expenditure = opt. use ~ max. (max.)/min. (max.) = stationary

~ e.g.: degree of: use/expenditure = work done/t [ $\sim$  demand/supplied = output/input ~ eff(iciency)]

~ use:  $E$ : usable/expended (supplied)

~ expended:  $E$ : ( $\eta = E_{th}/E$ )

~ action (efficiency): e.g.: work [ $\sim E$ ]: useful (effective)/supplied = work done ( $\sim \eta = W_n/W$ )

~ physics: stored/invested = degree of action

(laws): emission/absorption = dispersion

~ biology: efficiency/speed (m/s) = opt. degree of action

$E/S$ :  $\downarrow$ efficiency/ $\uparrow$ speed =  $\downarrow$ degree of action

$\uparrow$ efficiency/ $\downarrow$ speed =  $\uparrow$ degree of action

( $\sim$  work done (J)/energy expenditure by ATP consumption)

~ free (J/Nm): action/expenditure ~ e.g.:  $h/\text{momentum} \cdot \text{length}/hv$  (quantum)/ $kT$  ( $\sim Js/Nsm/J/J$ )

[action (Js) =  $E_t/F_t \cdot \text{space}$  (Nsm  $\sim p\lambda \sim \text{length}$ )  $\sim F \cdot \text{space} \cdot t$  (Nms) ~ e.g.:  $h = E/v \sim mv\lambda$ ]

~ Principles of life: Special/General = Generalized [stationary (~ opt.)]

~ e.g.:  $m/E = I$ : max. action/min. expenditure = opt. use  $\sim m/E = 1/v^2$

( $\sim$  min. necessary/min. possible = opt.  $\sim$  min. necessary)

[ $\sim$  principle of: least friction/min. possible = use  $\sim$  life]

~ min.:  $m$  (kg)/ $E = 1/m$  (space)/s (t) [ $\sim v^2$  ( $\sim c^2$ )]

~ life: action:  $E = 1/\text{space}/t \sim 1/\text{max.}/\text{min.}$  (= min.  $v^2$ )

$\sim 1/\text{min.}/\text{max.}$  ( $\sim$  necessary/possible) = opt. (e.g.: rest quant)

~ efficiency: max. effectivity/max. efficient = opt. efficiency (degree of action)

{ $\sim$  exergy  $\cdot t/p$  ( $= h/\lambda$ )/[hv ( $\sim p\lambda v \sim hc/\lambda$ )/ $kT$ ] = opt. (energetical) efficiency [ $\sim \lambda$ ]}

e.g.: glowworm (lampyridae)

~ Special life: cosmos (macro/micro = meso): proper:  $m/E = I$  [ $1/\text{space}^2/t^2$  ( $\sim c^2 \sim v^2$ )] = opt.

~ Newton/Planck = Rydberg ( $R_\infty/R$ )<sup>2</sup> [ $\sim s^2/m^2$ ]  $\sim$  Avogadro: mol:  $m/U = S$

[ $\sim$  life:  $m^{-3}/s^{-1}(s/m^3) \sim n_o(N_L)/R$  ( $\sim hR/p \cdot R_\infty = N_L$ )

~ macro: opt.:  $m/E = 1/(\text{min. space}^2/\text{max. } t^2 = \text{opt.}) \sim$  min. necessary:  $m/E = v^2$  ( $v \ll c$ )

~ e.g.: planet: motion/rest =  $1/v^2$  ( $\sim$  eco-system of the earth)

~ micro: opt.:  $m/E = 1/(\text{max. space}^2/\text{min. } t^2 = \text{opt.}) \sim$  min. necessary:  $m/E = v^2$  ( $v \leq c$ )

~ e.g.: photon: motion/rest =  $1/c^2$  [ $\sim$  Planck:  $m/E = 1/v^2$  ( $l^2/t^2$ )  $\sim c^2$ ]

~ meso: opt.:  $m/E = 1/(\text{mean space}^2/\text{mean } t^2 = \text{opt.}) \sim$  min. necessary:  $m/E = v^2$  ( $v < c$ )



~ e.g.: electron: motion/rest =  $1/v^2$

~ e.g.: quant: elementar (e ~ electron)/h $\nu$  (photon) = 1/harmonic (~  $\alpha$ ) wave [ $\sim R_\infty/R$ ]<sup>2</sup>

~ Opt.: Life: min. necessary/max. possible: equilibrium

~ e.g.: Planck:  $m/E = 1/v^2$  ( $l^2/t^2$ )

~ Relation for life: e.g.:  $E: kT/h\nu = hR \sim \text{macro/micro} = \text{meso} \sim \text{Boltzmann/Planck} = \text{Rydberg}$   
~ necessary: min./min. = min. ~ opt. ~ equilibrium

$m: \text{mol/ph (photon)} = e \text{ (electron)} \sim v: <c/c^2 = <c \sim E/v/E/c^2 = E/v^{(2)}$

~ Structure: special:  $m/E = I \sim \text{e.g.: } m/E = c^2 \sim h/E = 1/v$

~ general:  $I$  (~ e.g.:  $J/K = k$ ): matter/space/t = set (mol ~ Loschmidt-Nr. ~ Avogadro constant)

~ e.g.: nature constants:  $G/c = \text{Avogadro} \sim \text{Avogadro}/c = k$

set: rest/motion = substance

Q: particle/wave = particle ~ wave (e.g.: quantum waves resonance ~ binding E)

Rydberg:  $R_y (hR) \cdot R_\infty (\sim R_H \sim R_M)/R \sim hc(R_\infty)^2/cR_\infty = hR_\infty \sim Js/m \sim mv \sim m\lambda v$

Einstein: matter object/space-t ~ SRT/GRT ~  $\leq c/<c \sim \text{local/global} \sim \text{photon/galaxies}$

{ ~ life: matter object/space-t = matter object  $\approx$  space-t ~ SRT/GRT = SRT  $\approx$  GRT

~ local/global = local  $\approx$  global ~ photon/galaxies = photon  $\approx$  galaxies

~  $\leq c/>c = \leq c \approx >c$

~ wave: propagation velocity: group [action (h) ~ E]/phase = group  $\approx$  phase

~ evolution: black holes/galaxies = symbiosis

~ white holes/black holes = naked singularities (~ quantum stars)}

~ e.g.: matter: I. momentum/force (Ns/N) ~ II. action/E (Js/J) ~ I./II. = III.  $m \cdot [a/v^2 (c^2) = v]$

~ Set: e.g.: basic quantities of physics:  $m/\text{mol}$  (molar mass) = K

$m/E = I \sim m_e/h\nu$  (quantum) = k

~ Mathematics: structure/set = relation ~ e.g.: physics: matter/mol = I

~ System of numbers: algebra/geometry = analysis

~ Example: theory of numbers (arithmetic)/topology = harmonic analysis [Weyl theorem (functions theory)]

~ special: theory of numbers:  $\rightarrow \pm\infty/\rightarrow \pm\infty = 1$  ~ e.g.: unit circle:  $e^{ix(\sim\varphi)}: e^{i\pi/2}/e^{i2\pi} = e^{i\pi/4}$

[~ logistic function:  $iy/x = z$  ( $iy = x = z$ ): probability/asymm. = turning point ( $1/1 = 1$ )

~ Numbers:  $\mathbb{N}$ : perfect (~ magic)/prime = Fibonacci's

e.g.:  $6/137 = 2$  ~ nature constants: fundamental/dimensionless = life ~ h,c,G,e, $m_e$ , $m_p$ / $\approx\alpha=k (R/N_A)$

~ bosons/ $\approx\alpha$  = bosons/fermions

$6/7 = 2$  ~ fundamental constants/basic units (s, m, kg, A, K, mol, cd) = derived unit

~ h, c, G, e,  $m_e$ ,  $m_p/R$ ,  $R_\infty$ ,  $m_e$ , e/s,  $\Delta kT$ ,  $N_A$ ,  $R_y$  (hR) (~ Planck:  $t,l,m,I,T,m\sim N_A,E$ ) = J/K

$6/17 = 2 \sim C_6^{1/7}O = {}^2H$

$28/2 = 1 \sim {}^{54}Fe/H_2 = {}^1H$

$6/3 = 2$  ~ mathematics: x, y, z, u, v, w/triangle( $y/x = z$ ) = z ~ w

algebraic/(hyper)real = (hyper)complex

~ e.g.:  $\infty$ : topologic/geometric = analysis (infinitesimal analysis)-non-standard analysis ( $\approx$ )

$$\sim \pm\infty/\pm\infty = (x: \lim_{x \rightarrow 0} = 1/y: \lim_{x \rightarrow \infty} = 1) - (\approx 1) \approx 1$$

[~ non-standard mathematics: topology/analysis(~functional analysis) ~ stochastic = measure theory (Lebesgue)  
 $\sim$  e.g.:  $\approx 0/\approx \infty \approx 0$   
 $\approx 0/\approx 0/\approx \infty \approx 1$ ]

~ Mathematical traditions areas: number theory/geometry = analysis

~ e.g.: algebra/topology = real analysis  
 $\sim$  group theory/differential geometry = complex analysis (function theory)  
 $\sim$  topological group/algebraic geometry = Lie-group

~ Mathematical think: discrete/continuous = singular continuous

~ structures: theory of numbers/analysis = quantization

~ s: formal: pattern: numerical/geometrical [form/movement = fractals (~ chaos)]

~ nature language: pattern ~ symm. ~ group theory ~ periodic s of mathematics (~ chemistry):

e.g.:  
Atlas of Finite Groups (Conway/Curtis/Norton/Parker/Wilson)

~ Hypothesis: proof: classic method: Reductio ad absurdum (~ Hardy)

~ Mathematical philosophy: reality: true/provable~decidability (constructibility) = consistent (~satisfiable)  
truth values: true/ $\infty$  = true and false ~ Platonists/Intuitionists = Formalists

~ Special: numbers/sets = symbols ~ e.g.:  $\infty: \pm/\{ \} = \rightarrow \approx \sim \mathbb{N}/\{\mathbb{H}\} = \rightarrow 0$

~ Mathematical systematic: structures/logic = relations

~ Mathematics: reality/potentialities ~ Philosophy: necessity/freedom ~ nature/culture = life

~ Physics: laws of nature/complex of conditions = fundamental constants

constants (~ free parameters): fundamental/dimensionless = nature

quantization: dimension action: min. amount of the quantity:  $E \cdot t: =0/>0 = \rightarrow 0$   
 $\sim$  e.g.: classic/quantum theory = quasi classic ~  $p\lambda/h = mv\lambda$  (~  $E/v$ )

field: vector/scalar = tensor

~ Mathematical physics: conditions: initial/boundary = side  
eq.: algebraic/analysis = differential algebraic

~ State: static/dynamic = quasi-stationary (~ stationary: equilibrium: static/dynamic = statistic)  
 $\sim$  e.g.: eq.: algebraic/analysis = quasi-static

~ Sciences: empiricism/theory = approximation ~  $\rightarrow 1/\infty = \rightarrow 0$  ~ probability

~ Sciences thinking: dual/polar = complementary

~ Philosophy: apply: true/right = appropriate

picture: mathematics/physics: mathematical physics ~ e.g.: isomorph (map)/real = quasi image

~ Truth: objective/relative ~ absolute/subjective ~ sure/unsure = hypothesis  
 $\sim$  e.g.: space ~ t: Newton/Einstein = Leibniz ~ absolute/relative = relational

~ Evolution: Cosmos: simplicity/complexity (~ variety) = optimization (~ Leibniz)

$\sim$  max. temperature ( $\sim$  max. symmetry  $\sim$  min. structure)/  
 min. temperature ( $\sim$  min. symmetry  $\sim$  max. structure)  
 $\sim$  min. entropy (I)/max. entropy (I)}

$\sim$  Life  $\sim$  nature: state/measure = symbol ( $\sim$ term)

$\sim$  e.g.: material/(1/space/t) = interaction  
 $\sim$  static/dynamic = constant  
 $\sim$  physical:  $\alpha_G/e = h$  ( $\sim G/\hbar = F$ )  
 $\sim$  mathematical:  $\Psi_2: 360^\circ/137,5^\circ = 222,5^\circ \sim 1/\phi$  ( $\sim \tau$ ) =  $\phi^{-1} \sim 1/\alpha = \alpha^{-1}$   
 $\sim$  synthesis/genesis = xýnevolution  
 $\sim$  element/nucleo = cosmo  
 $\sim$  cosmo ( $\sim$  astro): biol./physics = chemistry  $\sim$  e.g.: quantum  
 $\sim$  cosmo(logy) : world models/QFT = Q  
 $\sim$  physics: cosmology/quantum = astroparticle

$\sim$  Living beings: culture (human)/nature = life [ $\sim$  e.g.: justice: talent: social encourage/pot. = effort ( $\sim$  diligent)]

$\sim$  as a rule:  $S \cdot m/s / (\text{neg}) S \cdot m^{-1} = \text{opt.}$  [(quasi) stationary equilibrium]

$\sim$  min k/min  $-k$  [ $\sim$  e.g. : efficiency: 1 output: surplus on essential need of  $-k/\text{min.}$  k  
 2 input: max.  $-k/\text{supply}$  of basic need by k]}

exergetic: 3 surplus on essential need of  $-k$  (action)/supply of basic need by k (expenditure)  
 $\Downarrow \sim \Sigma$

$1/2 = 3$  [ $\sim$  opt. output/opt. input = opt. exergy ( $\sim$  stationary = turning point)]

$\{ \sim U/S/S/U = U/U \sim S/S (\sim U/S \sim S/U)$

$\{ \sim y_1/x_1/y_2/x_2 = y_1/x_2 \sim x_1/y_2 (\sim y_1/x_1 \sim y_2/x_2) \sim z_1/z_2 = z_3 \}$

$\sim iy/x = z^n$  [domain of definition (z-plane,  $z = x + iy$ )]  $\Rightarrow iv/u = w^n$  [codomain (w-plane,  $w = u + iv$ )]  
 $\Downarrow \sim$

many-valued (multivalent) dyn. (many-sheeted + multidimensional) function  
 with severals (hyper) complex variables (quantities)}

e.g.:  $k \cdot \lambda R / -k \cdot R_\infty$  [ $\sim m/s$  ( $\sim$  velocity)/ $m^{-1}$  ( $\sim$  wave number)] =  $m^2/s$

$\{ \sim h$  ( $\sim$  action)/ $2m_e$  [quantum of circulation (circulation quantum)]

$\sim$  quantum of the circulatory integral  $\sim$  kinematic viscosity  $\sim$  diffusion coefficient (constant)  
 $\sim$  thermal conductivity (diffusivity)  $\sim$  velocity potential (flow potential or velocity)}

$\sim$  Logistic: function  $y = f(x)$  ( $\sim$  equation):  $y = 1/(1+e^{x(z)})$   $\sim$  e.g.: probability = symm./t

$\sim$  (probability) distribution  $F(x) = dx/dt \sim$  (probability) density:  $f(x) \sim p(x) = x$

$\sim$  e.g.: special: life phase = stability/age

general: life = evolution(equations  $\sim$  principle) [(complex) dynamical systems]

{theory of non linear dynamical systems: equations: systems, evolution}

$\sim$  sigmoid:  $y = 1/(1+e^{-x})$

$\sim f(t) = 1/(1+e^{-t})$

$\sim F(x)/f(x) = f(x) \sim [F(x) = x/f(x) = x] = [y = f(x)]$

$\sim$  e.g.: dynamical systems: equations: system/evolution = logistical  $\sim$  discrete/continuous = cont.-discr.

derivation: special:  $1./3. = 2. \sim (y')/(y''') = y'' \sim f^n: (f')/(f''') = f'' \sim \Delta^n: (\Delta)/(\Delta^3) = \Delta^2$

general:  $F^n/f^n = f^n$

special:  $v/j \sim (r) = a$  [velocity/jerk (rate of change of acceleration) = acceleration]  $\sim (m/s)/(m/s^3) = m/s^2$

$\beta/\alpha = D$  [coefficient: mass transfer/recombination = diffusion]  $\sim (m/s)/(m^3/s) = m^2/s$

$a/\dot{D} = D$  [thermal conductivity/absorbed dose rate = absorbed dose]  $\sim (m^2/s)/(m^2/s^3) = m^2/s^2$

{ $\sim$  differential calculation : max. + min. calculation: saddle point: ( $y' = 0/y''' \neq 0$ ) =  $y'' = 0$ }

$\sim$  Life: processes: (complex) dynamical systems: e.g.: stability/transport ( $\sim m^2/s$ ) = relaxation

{ $\sim$  irreversible; parabolic eq.: e.g.: reaction/thermal conductivity = growth

$\sim m/s$  (v)/ $m^2/s = m^{-1} \sim \lambda^{-1}$  (wave number) [ $\sim R_\infty$  (turning point = stationary  $\sim$  opt.)]}

$\sim$  events ( $\sim$  operations): reversible/irreversible = stationary ( $\sim$  critical) point

$\sim$  e.g.: reaction/transport = growth  $\sim$  chemistry/physics = biology

intensive/extensive = equilibration

~ entropy/negentropy = xýntropy and analogue  $m/E = I$  ( $m \sim I \sim E$ )  
respectively  $m/h\nu = k$  as well as  $mv^2/h\nu = hR$   
(~ constants:  $m_e/hR = k \sim \text{mol: } m/U = S$ )  
e.g. :  $hR/h = R$   
~ Planck units:  $m/E = I$  ( $E/T$ )

$\Uparrow \sim$

Méta Life:

Canonical Principle:

Principle of stationary (~ opt.) event(s) [~ action(s)]:

principles of: least (essential) effect(s)/min. (necessary) cause(s) = stationary (~ opt.) relation(s)

~ e.g.: motion/rest ~ kin./pot. ~ dynamic/static ~ degradation/building-up = conservation

~ harmonic limiting values: degeneration/regeneration = well

~  $e/s/s/e = e-s$

$\Downarrow \sim$

~ action (non:  $y/x \sim \text{action/cause}$ ) : actio e(s)t reactio: law: weak/strong = interaction

~ equations (laws) of motion: classic/QM = thermodynamics

$\Downarrow \sim$

Newton's second law (of motion): reaction principle:  $p/F$  ( $\sim Ns/N \sim mv/ma$ ) =  $1/s = \nu$

Newton's third law (of motion): actio(n) = reactio(n) [~ interactio(n) principle]:  $F/F \sim N/N$

$\Downarrow \sim$  e.g.: group velocity ( $c_{gr}$ ):  $dc/d\lambda = \nu$

Life laws:

1. First: action(s):  $m \cdot m^2/s/mv^2$  ( $\sim Js/J \sim Nms/Nm \sim h/h\nu$ ) = s

e.g.: Planck time ( $t_p$ )

time constant

period

cycle time

relaxation time

(mean) lifetime (of a particle)

coherence time

half-life

dwelt time

decay time

rise time

atomic unit of time

collision time

phase time

phase-difference time

zero phase time

canonical time unit

interaction time

unit time

2. Second: reaction(s): reaction  $\approx$  action ( $y \approx x$ ) [reaction/action]:  $m/s/m^2/s = R_\infty = 1/m = 1/\lambda = k = eV$

~ e.g.:

velocity/velocity potential = atomic mass unit

phase velocity ( $c_{ph}$ ) [(ab)normal dispersion:  $\lambda^{(-1)}$ ]/flow potential = electron-volt (eV)

reaction rate (velocity ~ catalysis)/complex flow potential = energy term ( $T = E_{tot} = hc$ )

group velocity/kinematic viscosity = cell constant ( $k = A/d$ )

diffusion rate (velocity)/diffusion coefficient = dimensionless normal coordinate

root-mean-square molecular speed (velocity)/thermal conductivity = electronic term ( $T_e = E_e/hc$ )  
 mass transfer coefficient/thermal diffusivity = wave vector ( $k = 2\pi/\lambda$ )  
 mass transfer resistance/quantum of the circulatory integral = complex wave number  
 atomic unit of velocity/circulation quantum [ $h/(2)m_e$ ] = Rydberg constant  
 propagation velocity/diffusion = propagation coefficient (constant)

3. Third: interaction(s): reaction(s)/action(s) = interaction(s) [ $y = x$ ]:  $m^{-1}/s$  ( $\sim 1/\lambda \cdot v \sim v/v \cdot v \sim R_\infty \cdot R$ ) =  $1/ms$   
 ~ General: frequency: local ( $\sim$  spatial)  $\cdot$  temporal  
 ~ Special: e.g.: effective cross-sectional area density  $\cdot$  collision frequency  
 (indirect spin-) spin (orbit) coupling constant  $\cdot$  direct dipolar coupling constant  
 vibrational anharmonicity constant  $\cdot$  hyperfine coupling constant in liquids (solids)  
 vibrational term  $\cdot$  angular velocity [(complex) frequency]  
 rotational term  $\cdot$  gradient of velocity  
 rotational constant in wave number  $\cdot$  rotational constant (in frequency)  
 propagation coefficient (factor)  $\cdot$  decay coefficient [ $\delta = 1/\tau$  (decay time  $\tau$ )]  
 phase-change coefficient  $\cdot$  velocity constant  
 natural (Napierian) absorption coefficient  $\cdot$  Einstein coefficient (transition probability) for spontaneous emission  
 harmonic vibration wave number  $\cdot$  damping coefficient

4. Zero: event(s):  $2./1. = 3.$   $\sim$  (complex) effect(s) = (complex) cause(s) [ $(i)y_n = x_n$ ]:  $m^{-1}/s \approx m^{-1} \cdot s^{-1}$  ( $\sim 1/\lambda \cdot v \sim R_\infty \cdot R$ )  
 {e.g.: scheme of terms [(E-)level diagram (scheme)]  
 wave number-frequency diagram (atmospheric sciences)}  
 correlation: frequency (local)/time  $\approx$  frequency (local  $\cdot$  temporal)}  
 ~ Generalized: numbers of dimension 1 (“dimensionless numbers”)/space/t = dimensionless fundamental constants (e.g.:  $\alpha$ )/space  $\cdot$  t  
 disciplinary/non disciplinary = meta disciplinary  
 ~ General: quantities: (complex) wave number/interaction time = frequency: local ( $\sim$  spatial)  $\cdot$  (complex) temporal  
 units of: atomic mass  $\sim$  electron-volt (eV)  
 undisciplinary: dimensionless: level/term = correlation  
 ~ Special: e.g.: disciplinary: atomic mass unit/(mean) lifetime = rotational constant in wave number  $\cdot$  rotational constant  
 intradisciplinary: energy term/period = vibrational term  $\cdot$  resonance frequency  
 interdisciplinary: eV ( $\sim$  cal)/half-life = vibrational anharmonicity constant  $\cdot$  Fourier number  
 transdisciplinary: term/phase time = complex wave number  $\cdot$  complex frequency

~ Méta Life:

Canonical Principle:

Special/Generalized = General [stationary ( $\sim$  opt.)]

e.g. :

transdisciplinary:

vibrations (oscillation): harmonic(Fourier) analysis: real form:

primary circular frequency:  $\omega$  for  $k = 1$

first harmonic (also: fundamental) with  $\omega_1 = \omega$  respectively  $k = 1$

$k$ -th harmonic [before:  $(k-1)$ -th overtone]: with  $\omega_k = k\omega$

~ harmonic wave

~ sinusoidal ( $\approx$   $\alpha$ ) oscillation ( $\sim$  wave)

~ (hyper)complex sinusoidal vibration( $\sim$  wave) :  $re(\sin(z))$ ,  $z = x + iy$ .  $im(\sin(z))$ ,  $z = x + iy$ .

{e.g. : unit circle :  $\varphi(\alpha)$  [ $e^{\pm i\varphi(\alpha)}$ ]  $\sim \sin(\alpha)$ ,  $\cos(\alpha)$ }

~ generalized (hyper)complex sinusoids:  $re\{y(t)\}$ .  $im\{y(t)\}$ .

~ vibration  $\sim$  wave: sinusoidal/generalized (hyper)complex sinusoids = (hyper)complex sinusoidal

e.g. :

unit circle:  $\varphi : \alpha/t = \alpha$

~ unit: sphere (S): circle/surface = ball  $\sim S^1/S^{n-1} = S^2 \sim \mathbb{R}^2/\mathbb{R}^n$  ( $\sim$  special: topological  $\mathbb{R}$ ) =  $\mathbb{R}^3$

~ (non-)dimensional (system):  $n/\infty = multi$   $\sim trans(c.)meta = hyper$

e.g.:

parameter/fuzzy = associative algebra

abstract:  $x, y, z, u, v, w = \alpha, \beta, \gamma$

( $\sim$  arbitrarily quantity  $Q$ :  $X, Y, Z$ )

e.g.:

$$\dim Q = X^\alpha \cdot Y^\beta \cdot Z^\gamma$$

~ conventions:

$$\text{ISQ} : \dim Q : L^\alpha \cdot M^\beta \cdot T^\gamma \cdot I^\delta \cdot \theta^\epsilon \cdot N^\zeta \cdot J^\eta$$

$$\sim \text{SI} : [Q] = m^\alpha \cdot kg^\beta \cdot s^\gamma \cdot A^\delta \cdot K^\epsilon \cdot mol^\zeta \cdot cd^\eta$$

~ unit circle :

quantities:

dimensionless :

e.g.:

$$1/\alpha = \alpha^{-1}$$

~ golden section:  $1/\varphi (= \varphi - 1) = \varphi^{-1} [(-1 + \sqrt{5})/2 \approx 0,61803] [\varphi = (1 + \sqrt{5})/2 \approx 1,61803 \text{ (golden ratio)}]$

{ $\approx$  relation of Fibonacci numbers: e.g.:  $55/34 \approx \varphi$  ( $\sim 34/55 \approx \varphi^{-1}$ )}

[Fibonacci numbers ~ golden ratio]}

~ golden angle:  $\Psi: \Psi_2/\varphi \approx \Psi (222,5^\circ/1,61803 \approx 137,5^\circ) [\sim \Psi/\Psi_2 \approx \varphi^{-1}] \{\sim \text{opt.}\}$

~ numbers of dimension  $1/\varphi(\alpha) = \text{fundamental constants}$

~ transfer coefficient  $\alpha$ /spin wave function  $\alpha = \text{inverse Sommerfeld (fine-structure) constant } \alpha^{-1}$   
 $(2\pi e^2/\hbar c = (137,0\dots)^{-1})$

parameters:

e.g.:

$$\text{dimensionless: } \hbar c/\lambda kT/\lambda kT/\hbar c(\lambda) \approx \hbar\omega/kT$$

fixed/free = non-dimensional

[~ standard model: nature constants ("28"):  $\hbar, c$  in  $\alpha/(m_e, \text{interaction forces}) = (\alpha)$ ]

constants ~ effects:

e.g.:

electromagnetism:

dimensionless:

von Klitzing (~ quantum Hall) [ $\sim$  (Sommerfeld) fine-structure  $\alpha$ ]/Josephson [ $\sim \hbar/e^2$  ( $\sim e^2/\hbar$ )/ $2e/\hbar$ ] = 1

~ von Klitzing/quantum Hall/Josephson/magnetic flux quantum  $\Phi_0$  [ $\sim (e^2/\hbar)/(h/e^2)/(2e/\hbar)/(h/2e)$ ] = 1

~ fractional quantum Hall / magnetic flux quantum = elementary quantum of electricity

$$\{\sim 1/\nu (6/3) \cdot \hbar/e^2/h/2e = e\}$$

$$\text{quantum Hall/quantum spin Hall } [\sim \hbar/2e^2 (ne^2: n = 1, 2, 3, \dots)/2\hbar/e^2] = 1$$

dimensional:

$$\text{quantum spin Hall/Josephson} = \text{elementary charge } [\sim 2e^2/\hbar (G_{xx})/2e/\hbar] = e (\sim e/\hbar)$$

$$\text{quantum Hall/elementary charge} = \text{elementary electric charge } [\sim e^2/\hbar/e/\hbar] = e$$

~ polar: di/mono = uni (e.g.: pole strength  $g: 2g/g = g$ )

$$[eg = \frac{1}{2} \hbar c (\hbar=c=1)]$$

$$\{g = \hbar c/2e = (1\hbar c/2e^2) \cdot e \approx (137/2) \cdot e\}$$

$$(\sim Js \cdot m/s/As = Jm/As = m \cdot m^3/s^2/As = m \cdot m^3/s^3/A \sim A = m \cdot m^3/s^3 = Nm^2/s = Fm^2/s = F \cdot m^2/s)$$

( $m^2/s$  = circulation quant, flow potential, velocity potential,...)

[~ ampere A: current strength: electro  $I$  (atomic unit, Planck  $I_P$ )/magnetic  $p$  = energy flow  $E$

e.g.: electrical current strength:  $I/I_P$  = atomic current unit  $eE_h/\hbar$  (Hartree)  $\sim A/A = A$  (SI)]}

factors:

e.g.:

$$\text{Boltzmann equation: } W/kT/-W/kT$$

~ Boltzmann ~ Arrhenius  $\approx$  van't Hoff:

Arrhenius number/Boltzmann factor ( $\sim$  Boltzmann molar energy/Arrhenius equation)  $\approx$  van't Hoff factor  
 $\{Arh = E_A/RT(\text{number of dim } 1)/W(E) \propto e^{-E/k_B T} (\sim W(E) \propto e^{-E_m/RT}/W(E_A) \propto e^{-E_A/k_B T}) \approx \text{inverse value } 2,5$

[~ opt. = 1: inverse value 3,5 (~ van't Hoff rule (RGT): rule of thumb: 2,875... time by  $\Delta + 10^\circ$  Temp.)]}

{Schrödinger (~Boltzmann and Delbrück):

degree of stability:

van't Hoff:

$$\text{Van't Hoff's law: mutability formula: molecule life time: } t = \tau e^{W/kT}/e^{(-10)W/kT^2}$$

[discontinuity of mutations: mutability: max. 0,5/min. 0,2 (~ van't Hoff factor: inverse value 2,5)

~ gene: stabil/instabil = quasi stabil

~ chemical reactions: threshold values (1:2):

Delbrück:

$W/kT = 30, 50, 60 \sim t = 1/10 \text{ s}, 16 \text{ months}, 30\,000 \text{ years} \sim \text{room temp.} = 0,9, 1,5 \text{ respectively } 1,8 \text{ eV}$

[ $kT \sim \text{mean (kinetic) (heat) energy}$ ]

~ Schrödinger:

entropy/body temp. = life intensity

matter: structure ("states"): (molecule = solid-state = crystal/gas = liquid = amorphous) = quasi amorphous solid body

$\tau \sim (\text{complex}) (\text{harmonic}) \text{ molecular vibrations: femtochemistry}$

principle ~ constants:

e.g.:

wave/particle = lasing threshold

~ coherence/incoherence = coherent states (~ quasi coherence)

~ f : occupation: coherent regime/incoherent regime (chaos or thermic) = lasing threshold [ $\sim >1/<1 = 1$ ]

{~ e.g.: thermodynamics: emittance  $\varepsilon$ /absorptance  $\alpha$  (absorption factor) = phase boundary (~  $1/1 = 1$ )}

~ f : occupation numbers: emission rate/absorption = lasing threshold [ $\sim >1/<1 \approx 1$ ]

{~ e.g.: dna (Bose condensation)}

coefficients:

numbers [of dimension 1 ("dimensionless numbers")]/parameters = factors

~ e.g.:

physics/mathematics = chemistry: mass transfer/Fourier = propagation

physics: symmetry/asymmetry = symmetry: quasi ~ dis = fuzzy

{e.g.: atomic and molecular/nuclear:

symmetry number s/asymmetry parameter K = dissymmetry factor (~  $1/1 = \text{interaction term}$ )

[~ e.g.:  $J^{-1}/1 = 1/J$  (~ number/hR)

molecules: (homo)chirality]}

term:

e.g.:

Navier-Stokes:

flow sciences:

fluid: ideal/real ~ Euler/Newton ~ frictionlessness/friction ~ eq.: Euler/Navier-Stokes

transport: mass ~ heat: flow round a body: swirling: laminar/turbulent ( $\neq 0$ ) = quasi (= 0)

~ Navier-Stokes eq.: Reynolds number:  $\langle\langle Re_k \rangle\rangle Re_k = Re_k$

~  $Re: >0/>0 \equiv 0(v_t)$

~ laminar/turbulent  $\approx$  stationary ~ bifurcation

~ numbers of dimension 1: [Lewis(Le) = 1]/[Le a/ $\lambda$ ] = Sherwood(Sh)/Nusselt(Nu)

dimensionless parameters (numbers):

e.g.:

transport: mass/heat = 1

~ numbers: Fourier(Fo) II/Fourier = 1

~ Colburn(J) II/Colburn = 1

~ Stanton(St) II/Stanton = 1

~ Stanton II/Colburn II/Stanton/Colburn = 1 ~ Lewis

~ Sh/Nu = quasi

mathematics:

[hyper](complex):

number theory/algebraic = geometry

algebraic (number theory, groups, ...)/geometry = analysis (limiting values, algebraic functions, ...)

~ algebraic/general form of geometry [topology (space topology: manifold)] = analysis

~ structures/sets = relations

~ object/idea (~ imagination) = concept (~ notion)

condition (~ consistency)/measure = sign

~ quality/quantity = (formula) language [~ term(...)]

~ essence/event = symbol

e.g.:

Größe (G):

material/space/t = interaction

quality/quantity = hybrid (size ~ variable):

m (properties, measure)/E (abilities, measure) =  $1/v^2$  ( $s^2/m^2$ )

{~ /√: s/m ~ s · (eV/hc) [h ~ ħ = eV · s]}

~ Planck:  $m_p c/E_p = t_p/l_p$  (~  $F_p \cdot t_p$ ) {~ force (N) · collision time (s)/photon (quantum)}

[photon =  $h\nu = E = J = Nm = Ns \cdot v$ ]

~ p/E (Ns/Nm) [~ mv/hR]

~ atomic unit of: force ( $E_h/a_0$ ) · t ( $\hbar/E_h$ ) ~ momentum ( $\hbar/a_0$ )/energy (Hartree:  $E_h = \hbar^2/m_e a_0^2 \sim e^2/4\pi\epsilon_0 a_0 = 2 R_\infty hc$ )

~ Rydberg :  $R_\infty/R$

~ wave number/frequency

~ t · wave number

~ general:

1. p/E = F ~ Ns/Nm = N ~ mv/mv<sup>2</sup> = ma

2. molar Planck constant/molar Planck constant = s/m ~ Js/mol/Jm/mol = s/m ~ m · m<sup>2</sup>/s/m · m<sup>3</sup>/s<sup>2</sup> = s/m

molar Planck constant ( $E_m = J/mol$ )/ $E_p = l_p \sim t_p$  (m ~ s)

affinity of reaction (A) · m [~ radius (r): nucleus, electron, ionic, Bohr ( $a_0 = \alpha/(4\pi R_\infty)$ )]/activation energy ( $E_{A(a)}$ ) · m { (~ generalized) coordinates (s): Cartesian ~ spherical ~ cylinder } = 1 [~ coefficient: friction  $\mu$  (f) ~ viscosity (b) ~ air friction (d)]

[mathematics: elementary: algebraic/geometry = analysis ~ e.g.: coordinates (s)]

molar free enthalpy ( $G_m$ ) · m/internal energy ( $U_m$ ) · m = 1

molar enthalpy ( $H_m$ ) · m/internal energy ( $U_m$ ) · m = 1

[standard( $\mu_i^0$ )] [electro( $\mu_i$ )] chemical potential {in phase  $\alpha$  ( $\mu_i^{(\alpha)}$ ) ( $\mu$ ) · m/internal energy ( $U_m$ ) · m = 1

enthalpy of reaction (Q) · m/activation energy ( $E_{A(a)}$ ) · m = 1

I:  $1/2. = 3. \sim E/N_A hc_0 \sim p/N_A h = F/h\nu$  (1/m)

[~ vice versa: II:  $2./1. = 3. (m)$ ]

{~ wave: number ( $\sigma$ ) ~ length ( $\lambda$ )}

~ generalized:

wave: harmonic ("sinus"):

III: I ( $\sigma$ ) · II ( $\lambda$ ) = 1 (~  $\sigma = 1/\lambda$ ) [~ I/II = 1 (~ opt.)]

{[Info.: F (~p) ~ E (~h):

e.g.:

F/E = 1/m ~ p/E = s/m

F = p · collision frequency

E = F · collision diameter (d)

Nm = E = F · collision mean free path (point ~ position ~ place ~ locus)

~ Jm = E · m = E · collision mean free path = F · (collision) cross section ( $\sigma$ ) = p · sm<sup>2</sup>

Ns = p = F · collision time (s) = impulse of force (drive)

~ Js = angular impulse = E · collision time (s) = energy impulse = Nsm: pulse duration ~ F · sm)

general:

p/F/h/E (Ns/N/Js/J) = 1 ~ p/h/N/E = 1 ~ p/h/E/E ·  $\lambda$  (Jm) = 1}}

~ space · t: m/s · s/m = 1: space · t · t-space = t-point · point-t

(in the right place to the right time ~ vice versa)

~ Daoism: momentum/action = equilibrium (~ vice versa)

{effect/cause: action/momentum (h/p) =  $\sigma \sim Js/Ns = 1/m$

(~ momentum/actio(n) (p/h) =  $\lambda \sim Ns/Js = m$ ) [~  $\sigma = 1/\lambda \sim \sigma \cdot \lambda = 1$ ]

e.g.: Planck:  $h/\hbar/l_p$  ( $m_p c$ ) =  $l_p$  (~  $\lambda_p$ ) [~  $\sigma_p = 1/\lambda_p \sim \sigma_p \cdot \lambda_p = 1$ ]

~ good utilize(r): food ~ matter cycle (~ metabolism) [~ m/E = I (~ opt.)]

semiotic:

human being/nature = life:

e.g.:

numbers: algebraic/(hyper)real = (hyper)complex

love: mental/sensual (~ body in the narrower sense) = spiritual

behaviour: A) human being (iy/x = z):

I. What is?/II. What should? = III. What need?:

I. What does I believe?/What can I know? = What should I do?

e.g.:



*culture/nature = (opt.) life*  
 II. What should I know?/What does I believe? = What can I do?

*e.g.:*  
*reality/possibility = imaginaries*  
 III.: I./II. = What does I do?  
*e.g.:*  
*love: beauty/true = good*  
 B) nature ( $y/x = z$ ): should/can = does

*e.g.:*  
*balance/probability = limiting values*  
 C) life ( $iv/u = w$ ): A)/B) = opt.  
*e.g.:*  
*harmony/cooperative = symbiotic*

~ (opt.) life *s*: every creature(nature) should appropriate his abilities so quick as possible (t) and so much as necessary (m) does effect there (space ~ point ~ position ~ place ~ locus), where these support opt. for themselves (s) and all others (e), as in this meaning as dynamic supporting life equilibrium (se) can achieve.

*general basics:*  
 $m/E = I$   
*e.g.:*  
*matter/non-matter = semiotic*  
 ~ symmetry/asymmetry = symmetry: quasi ~ dis = fuzzy  
 ~ symmetry number  $\sigma (J^{-1})$ /symmetry number  $s$  = degree of symmetry

*correlation (~ proportion, interdependence, interrelation):*  
*e.g.:*  
*correlation function: symm. (symmetrized)/elementary (non-symmetry) = canonic*  
*statistic physics: equilibrium s/non-equilibrium s = fractal theory*  
*[ phase change: correlation length/noise: correlation time  $\tau$  = correlation length*  
*dto./kinetic gas theory: relaxation time approximation: correlation time  $\tau$  = correlation dimension]*  
*correlation interaction /correlation coefficient = correlation factor*

*vibrations:*  
*harmonic/non-harmonic = quasi harmonic*

*cosmic microwave background (CMB) radiation (CMBR): harmonic: vibration ~ wave*  
 $\Downarrow \sim$

~ Efficiency: action/power = life(time) ~  $J_s/J/s = s^2$  ~ e.g.: life: creativity/workaholic = stationary (~ opt.)

~ Thermodynamics: equilibrium: laws:  $2./(2./1.)/(2./1.)/3. = 0. (\sim 4.)$  ~ e.g.: E: bound/free = quasi  
 equilibrium/non-equilibrium = phenomenological (~ statistical) [~ statistical physics]  
 ~ (dyn.) s: closed/open = partial open ~ quantity/quality/quality/quality = stationary  
 [~ entropy/enthalpy (F, G and H)/exergy/negentropy]  
 ~ e.g.: feedback: positive/negative/negative/negative = opt. ~  $p \gg n/p > n/p < n/p \ll n$  = stationary ( $p = n$ )  
 work: capacity [~ heat (thermal) capacity C]/useful (free enthalpy F, G)/useful (exergy)/capacity  
 $[(J/K)/J/J/(J/K)]$   
 values: quantity  $\gg$  quality/quant.  $>$  qual./quant.  $<$  qual./quant.  $\ll$  qual. = opt. (quant.~qual.)  
 features: symm./asymm. = interaction ~  $s \gg a/s > a/s < a/s \ll a$  = opt. ( $s = a$ )  
 equilibrium: state: quantity (variable ~ function): extensive *E*/intensive *I* ~ e.g.: quantity:  
 quantity, extensive, capacitive; capacity parameter/quality or intensive  
 ~ state/process ~ processes: reversible/irreversible ~ equilibrium/non-equilibrium  
 ~ density: energy, entropy/energy flux, entropy current

state(s)/process(es) = state processes (e.g.: Markov process) ~ change in (of) state

~ s (opt.): (opt.) state(s)/(opt.) process(es) = (opt.) dynamic state(s) ~ (opt.) state process(es) ~ (opt.) change in (of) state(s)  
 ~ change in (of) state/change in (of) state = dynamic state(s) ~ e.g.: dyn. s/Markov process = relaxation (process)

- ~ Feedback: positive/negative = stationary (~ opt.)
  - ~ e.g.: biological function: autocatalysis/transport = circadian rhythm (chronobiology)
- ~ Evolution: selection/variation (e.g.: mutation and recombination) = reproduction ~ fitting ~ adaptation
  - ~ e.g.: selection: gene/group = individual (~ culture: bloody/family = money)
  - bio: reproduction/genetic change = metabolism
  - self-interest/altruism = cooperation
  - xýnevolution: cooperation/altruistic = symbiosis
  - processes: irreversible: transport/diffusion = growth
  - unit: biological: selection: key qualities: inheritance/individuality = reproductivity
  - time: regeneration/degeneration = relaxation
    - (~ activation/induction period ~ rekonvaleszent/incubation period)
- ~ Essential properties of living systems: self-reproduction/mutagenesis = metabolism ~ e.g.: selection
- ~ Life(genesis): evolution/xýnevolution = symbiogenesis
- ~ Behaviour: will/can = allow ~ pass/develop = survive ~ human/divine = mystic
  - ~ imagination: utopia (~ vision)/dream = fantasy ~ t: future/past = present
    - to do the impossible/to do the possible = to do the opt. possible
    - [e.g.: moon landing 1969/nature equilibrium = (opt.) life welfare]
  - ~ transmitter: serotonin/melatonin = dopamine (~ happy/natural equilibrium = social balance)
  - ~ thinking: rational discursive/intuitive = divergent
    - ~ min./max. = min.-max.
    - ~ differential/geometry = probability ~ t:  $n/\infty = \rightarrow 0$  (~1)
    - ~ formal/informal = quasi ~ mathematics/meta dimension = ~
    - e.g.: christian/hindu = mystics
- ~ identity: genetic/epigenetic = behaviour (symbolic: language + culture)
  - e.g.: thinking: i/it ~ abstract/empathy ~ explicit/implicit ~ conscious/intuitive
  - language: hieroglyphs/geoglyphs = glyphs (~ symbols)
- ~ Human being: one for another/everyone for everybody = one for everybody as (~) everyone for one
- ~ Elements of life: isotopes/isotones = isobars
  - spin: down/up = superposition ~ e.g.: electron
- ~ Basic molecular processes (in cells): convection/diffusion = bonds
- ~ Basic organism budget (balance) regulation: water (~ electrolyte)/oxygen (respiration) = acid-base
- ~ Regulation: molecular: biological function:
  - DNA (gene ~ genome): genetic/epigenetic = nucleic acids (~ amino acids) ~ chromatin
  - RNA: catalysis/transport = stabilizers of structures + information carrier (~ transmission)
  - protein (~ proteom): catalysis/transport = stabilizers of structures + information carrier (~ transmission)
  - folding: harmonic/disharmonic = quasi(harmonic) ~ e.g.: protein
  - values: intern(al)/extern(al) = equilibrium ~ non-matter/matter = quasi-matter
  - molecular genetics: diploide organism: chromosome pairs: configuration: trans/cis (~ disease/health) = mutation distribution
    - (~ e.g.: Homologous chromosome: Haplotype: 1/2 ~ female/male ~ xx/xy)
- ~ Eukaryots: corals/algae = plankton
- ~ Homo: culturalis/naturalis = vitalis (vivere) ~ e.g.: faber/ludens = sapiens-rapiens
  - ~ spiritualized/inspired = animated
  - ~ meta: interpretierus/symbolicus = reflexivus
  - ~ oeconomicus/oecologicus = sociologicus
  - ~ idealis/realis = creatoris
  - ~ non vegetarian (carnivore)/vegan (herbivore) = vegetarian
  - ~ hominoidea: behaviour: warlike/peaceful = both
    - [~ e.g.: primates: human/orangutan(g) = prosimian
    - chimpanzee/gorilla = bonobo ~ howling

(~ patriarchat/patchwork = matriarchat)

pulse control:  $-/+ = \mp$

~ anthropoidea: homo/anthropoid = hominoid

~ passion (greed)/goodness = restraint

~ invention/discovery = innovation

~ sciences: arts subject (~ humanities)/nature = mathematics

~ mathematics: creative/discovery ~ creatively/truth ~ idea/proof

~ symmetry: perfect (~ ideal ~ complete)/a = quasi

~ philosophy: sophy: theo/nature = anthropo

~ emotions/feelings = sensation

(e.g.: critical ~ proof/critical ~ proof = healthy

~ cool/empathy, compassion = sensitive

~ experience, experienced:  $-/+ = \pm$

~ optimists/pessimists = intuitive)

~ psychology: memory: cultural/collective = communicative

unconsciousness: Freud/Jung = psychodyn.

individual/collective = group

reality/imagination = hybrid fuzzy

~ evolution: brain: puberty/pubescent = climacteric

concentration/dreams = daydreams

(~ networks: conscious/primary = standard-primary)

neo cortex/amygdale = hippocampus ~ e.g.: fear

~ Wise of life: wisdom/good = good sense ~ empathize/sympathetic = compassionate

~ Music: classic/modern = semitone (half tone: Well-Tempered Clavier ~ temper mood ~ equal temperament ~ floating equilibrium)

~ mood: atmosphere/mind = emotion ~ mind/spirit = body ~ t: short-term/long-term = middle-term ~ e.g.: melody

~ Life values canon: quality: harmonic synthesis/synevolution = xýngenesi (s) (~ opt. = 1)

~ e.g.: degree (~ gradient): efficient (eff): efficiency (effectively)/efficiency = symbiotic equilibrium  
[~ effectivus/efficere]

{ ~ e.g.: energy quality [(degree of) exergy]: efficiency (eff)/productivity

~ effectiveness/value creation ~ eco: efficiency (effectively)/efficiency

~ (degree of) sustainability: efficiency/sufficiency (self/eco)

$[(\sim h/p \cdot \lambda/k/-k) [\sim E \cdot t/E \cdot t/(S/T/-S/T)]]$

~ Values: universal canon(ic): s ~ u: culture/nature = life

~ e.g.: happiness: mind/spirit = body

politics: democracy: indirect/direct = consensual ~ passive/active

~ egalitarian /libertarian = solidarity

together: create/participate = effect

Lincoln: government: for the people/of the people = by the people

servant: state/people = society

law: quid pro quo/Do ut des = Tit for tat

rules: golden (passive-negative)/golden (active-positive) = law

society: cultural(ism)/natural(ism) = vital(ity)

~ e.g.: media: actuality/universality (variety) = periodicity

views (~ attitudes): liberals/fundamentals = moderates

behaviour: psychology: character (~ nature): mind/soul = body

~ e.g.: views/values = motivation

problem: character weakness: e.g.: status: quo/quo ante (bellum) = bias

~ classes (~ sections): upper/lower = middle ~ power/performance = education

~ power play/work = productivity ~ work: less/poor = aholic

~ guardian/climber (parvenu) = keeper ~ elitist/totalitarian = liberalist

~ rich/poor = bourgeois ~ egocentric/opportunistic = pragmatic

~ hedonistic/democratic = overly pious ~ narcissist/psychopath = egomania

economics: market/state/natural = vital

homo oeconomicus/animal spirits = homo spirits

~ monetarist + (neo)liberal/(neo)Keynes/sufficient = coevolutive (~ sustainability)

~ capital(ism)/commun(ism) = social(ism)/natural(ism) = vital(ism)

[~ capitalist: profits privatisation/losses socialisation = added value

communist: dto. inverse: cost/use = net product

socialist: expenditure/income = necessity

naturalist: degree: action/use = need



*trans/metà = méta trans*  
~ e.g.:  
*trans naturalia/metá physiká = physiká naturalia*

<i>relations:</i>	<b>Culture</b>	<b>Life</b>	<b>Nature</b>
<b>meta</b>	<i>metá physiká</i>		
<b>meta trans</b>		<i>physiká naturalia</i>	
<b>trans</b>			<i>trans naturalia</i>

↕ ~

Fuzzy:  
symm. ~ (probability) distribution [~ true seem(ing)] ~ distributions: normal ~ logistic ~ gamma  
{mathematics: logic/sets = relations ~ algebra (arithmetic)/geometry (topology) = analysis (functions,...)  
[arithmetic: numbers/intervals = sets]}  
~ ↓↓  
symm./asymm. = fuzzy symm. (quasi/dis) [opt.: quasi ≈ dis]  
{life: mathematical optimization process: selection/structures = efficiency  
~ e.g.: (evolution equation: extremum principle: types of molecules optimized in basis of selection values)/(essential  
structure: optimized molecular sequence) = evolutionary optimization to a level of vital quality efficiency  
~ useful: work (effective)/E = interaction [E: free enthalpy/exergy = efficiency (~ eff = eff)]  
~ life (optimum) equilibration process:  
*Life(opt.) efficiency: (opt.) energetic/(opt.) energy conversion* ( $\eta = E_{th}/E$ ) [*~ (opt.) exergetic level of utilization*] = (opt.)  
*interaction (stationary: opt. = 1) [~ life(opt.): (opt.) well-being/(opt.) demand = (opt.) harmony*  
~  $s/e/s/e = s/e \Leftrightarrow s\sim e/s\sim e = s\sim e$ ]}  
e.g.:  
(*complex*) *distributions*:  
general (standard) normal (Gauss)/log normal = generalized (normal/log normal)  
~ sigmoid: (standard) logistic/log logistic = generalized (logistic/log logistic)  
~ (standard) gamma/log gamma = generalized (gamma/log gamma)  
[~ *culture/nature = life*]:

<b>perfect (ideal) symm.</b>	<b>imperfect symm.</b>	<b>quasi symm.</b>	<b>partial symm.</b>	<b>dissymm.</b>	<b>imperfect asymm.</b>	<b>perfect (total) asymm. (non-symm. ~ unsymm.) [~ dyssymm.]</b>
e.g.: Feigenbaum-scenario:						
	$r_1 = 3$ bifurcation start (~ I)	$r_\infty = 3,569945$ chaos start (quasi chaos ~ II)	$r_{opt.} = 3,7849725$ chaos: quasi ~ dis (~ II)	$r_{opt.} < r < 4$ dischaos (~ II)	$= 4$ asymm. start [full developed chaos (~ III)]	

<i>qualities</i> (imperfect):	I	II	III
	Symmetry	Symmetry ( $a/b = c$ ): Quasi/Dis = Fuzzy  {opt.: symmetry: quasi ≈ dis = fuzzy ~ symmetry: quasi/dis = fuzzy ≈ 1 ~ process: logistical: growth/decay = approximation ( $\rightarrow \approx 1$ )	Asymmetry

		<p>[opt.: <math>\approx 1</math> ~ special: decay (<math>\rightarrow \approx 0</math>): opt.: <math>\approx 0</math>]  {~ symbiotic complementary  ~ harmonic resonance (reflection)  e.g.: quantum waves resonance  ~ reflective resonance  ~ interaction: resonance/reflection =  harmonic ( ~ synchronic) [opt. = 1]  ~ e.g.: reflectance <math>\rho = 1</math>,  resonance amplitude of Z (Z):  Z = state parameter  (Z) = quantity}  ~ interactions:  harmonic resonance (Z)/harmonic reflection (<math>\rho</math>)  = reflective resonance Z(t) [<math>\sim 1/\nu</math>]  {e.g.: general: interference of vibrations:  frequency synchronizing of 2 harmonic waves  with <math>\Delta</math> circular frequency  (~ Lissajous-figures etc.)  ~ special: superposition principle: linear  differential eq.}</p>	
~ e.g.:	<p>{(molecular) partition fct. [~ wave fct.] ~ ensemble} chiral [field theory, high-energy physics (particle physics), nuclear physics] flavor or chiral (QFT, QCD) achiral (~ amphichiral) [~ non-chiral (Anthony Garrett Lisi)] {pseudo- asymmetric(al) [chiral]: meso compound (r and s)}</p>	<p>~ e.g.:  {dto.} 1. hybrid fuzzy system [diff. algebraic eq. (DAEs)]  {dynamic (complex) system:  (nonlinear) differential eq.: ordinary/partial  ~ finite-dimensional/  <math>\infty</math>-dimensional [attractor = finite-dim. (as a rule)]  ~ a lot of degrees of freedom: finite/infinite  (hybrid: eq.: difference/differential ~ jump/flow  ~ behaviour: discrete/continuous)}  2. quasi-equivalence/factor  3. virus/proteins, molecules, (homo)chirality:  macromolecules  [e.g.: L-amino acids, D-sugars],  4. living systems: molecular building blocks,  molecular structures, orbits, crystals,  enantiomery (~ chirality)  5. deterministic chaos:  e.g.:  Feigenbaum-scenario: 2. constant/1. constant  (universally) = limiting value  ~ chaos transition: <math>\alpha/\delta = r_\infty</math>  (chaotic regime: <math>r_\infty \leq r \leq 4</math>)  [<math>\sim 2,5029787.../4,6692016... = 3,569945...</math>  (opt. = <math>r = \frac{1}{2} \cdot (r_\infty + 4) = 3,7849725</math>)]  ~ mathematical constant: relations: e.g.:  <math>\Delta \approx 0,42</math> [<math>\sim \ln \approx 1,53</math> (~ Lieb's ice square)]:  MRB <math>\sim \Phi \sim \ln 2,8</math>  ~ Backhouse's <math>\sim \ln 6,5 \sim P_2 \sim e \sim \pi \sim r_\infty</math> (~ r)  [0,18... ~ 0,61... ~ 1,03... ~ 1,45... ~ 1,87...  ~ 2,29... ~ 2,71... ~ 3,14... ~ 3,56... (~ &lt;4)]  [0,187859 (MRB)/1,03 (~ <math>\ln 2,8</math>) = 0,61803 <math>\Phi</math>(~ <math>\varphi^{-1}</math>)  ~ 1,45... (Backhouse's)/2,29... (<math>P_2</math> parabolic) =  1,87... (~ <math>\ln 6,5</math>) ~ <math>e/r_\infty = \pi</math>]  {<math>y = e^x \sim \ln \approx 1,53 = e^{\approx 0,42}</math>}  ~ (dimensionless) nature constant  (~ physical quantity):  <math>\ln 1,53...</math> (~ 1,52...)  [<math>\sim</math> logarithm naturalis (<math>\ln</math>) <math>\approx 0,42</math>]: e.g.:  equilibrium constant (coeff.) <math>K(K_{th} = e^{-\Delta G/RT})</math>  symmetry coefficient <math>\alpha = 1</math>  Lyapunov exponent <math>\lambda(x_0) = ... \ln</math>  info. eq. (Shannon)  activation energy <math>E_A</math> (<math>Arrh = Arrhenius</math>): <math>e^{-E_A/RT}</math>  [van't Hoff's law (RGT)]  cell voltage energy</p>	~ e.g.:  {dto.} chirality (molecules) [physical chemistry (stereoisomerism), stereochemistry (CIP system: R- or S-: proteins, carbohydrats, nucleic acids, etc.)]

		<p>Boltzmann eq.: <math>S = k_B \ln \Omega(W)</math> [probability]</p> <p>principle of max. entropy: <math>e^{\Omega}</math></p> <p>radiation law (Planck): <math>e^{h\nu/kT}</math></p> <p>wave eq.: <math>e^{i(kx - \omega t)}</math></p> <p>Schrödinger eq.: <math>= e^{-i\hbar p \cdot r}</math></p> <p>Thermodynamic: reaction kinetic: <math>= e^{-\alpha x}</math></p> <p>harmonic vibration</p> <p>Euler-Mascheroni constant <math>\gamma (= 0,57\dots) = e^{-x} \sim e^{-t}</math></p> <p>exponential process: I growth: <math>e^{t/\tau}</math></p> <p>II decay: half-life</p> <p>life time: <math>e^{-t/\tau}</math></p> <p>III approximation: <math>e^{-t/\tau}</math></p> <p><math>[I/II = III: e^{\approx 0,42}/e^{\approx 0,42} = e^{\approx -0,14}</math></p> <p><math>\sim \ln: \approx 1,53/\approx 0,66 (\sim C_2) = \approx 0,87 (\sim B_4)</math> [opt.]</p> <p><math>\{ \sim S(k)/S(-k) = \text{mini-max } S</math></p> <p>(stationary: opt. = turning point)</p> <p>[<math>\sim I: (S/k)/(S/-k) = \text{opt. } (S/-k) \sim e^{\Omega}/e^{\Omega} = e^{-\Omega}</math>]</p> <p><math>\sim e.g.: e^{W/kT}/e^{10W/kT^2} = e^{-10W/kT^2}</math></p> <p><math>[W = \text{threshold } E (\Delta E)]</math></p> <p><math>\sim k \log D/k \log D = k \log (1/D)</math></p> <p><math>\sim S/-(S) = -(S)\}</math></p> <p><math>\sim \text{logistic differential equation: } e^{\pi}/e^{\pi} = e^{-\pi}</math></p> <p>(e.g.: biomathematics: evolution theory:</p> <p>population ecology)</p> <p><math>\sim \text{logistic function:}</math></p> <p>point: upper/lower = middle</p> <p><math>\{ \sim \text{saddle/saddle} = \text{turning (stationary)}</math></p> <p><math>\sim \text{value: threshold/threshold} = \text{opt.}</math></p> <p><math>\sim \text{limiting/limiting} = \text{limiting (lim. } \rightarrow 1)</math></p> <p><math>[\sim \text{extreme: max./min.} = \text{minimax}</math></p> <p><math>\sim \text{limiting/threshold} \sim \text{threshold/limiting}]</math></p> <p><math>\sim \text{statistical physics and information theory:}</math></p> <p>partition function (Z) <math>e^{\Delta E_i/kT}/E_A = e^{-\alpha x}</math></p> <p><math>\sim \text{wave eq./Schrödinger eq.} = \text{harmonic vibration}</math></p> <p><math>\sim \text{Planck } (e^{h\nu/kT})/\text{reaction kin. } (e^{-\alpha x}) = K_{th} (e^{-\Delta G/RT})</math></p> <p><math>\sim \text{laws: emission/absorption} = \text{dispersion}</math></p> <p><math>\sim e^{ikx}/e^{an(\omega)x} = e^{-W/kT}</math></p> <p>(Stefan Boltzmann law: Planck law: Taylor</p> <p>expansion: integral/Beer law = Richardson's law)</p> <p><math>\sim \text{phase space methods of quantum statistics:}</math></p> <p>Wigner: <math>e^{ipy/\hbar}/e^{iqu/\hbar} = e^{-iqu/\hbar}</math> (<math>\sim</math> Weyl)</p> <p>coherent states</p> <p><math>\sim \text{quantum mechanics and probability:}</math></p> <p>quantum mechanics of many-particle systems:</p> <p>second quantization:</p> <p><math>e^{\zeta^2}/e^{\zeta^2} = e^{-\zeta^2}</math></p> <p><math>\sim \text{probability theory: function: generating:}</math></p> <p>characteristic: <math>e^{i\zeta x}/e^{i\zeta x} = e^{-i\zeta x}</math></p> <p>characteristic/Laplace = Laplace:</p> <p><math>e^{i\zeta}/e^{\zeta} = e^{-\zeta} \sim e^{i\zeta X}/e^{\zeta X} = e^{-\zeta X}</math></p> <p>moment/Laplace = Laplace:</p> <p><math>e^{\zeta X}/e^{\zeta X} = e^{-\zeta X}</math></p> <p>e.g.: distribution: normal/lognormal = lognormal</p> <p><math>\sim \text{stochastic processes: spectral theory:}</math></p> <p><math>e^{2\pi i \omega t}/e^{2\pi i \omega t} = e^{-2\pi i \omega t}</math></p> <p><math>\sim \text{statistical theory of biological systems:}</math></p> <p><math>e^{\Delta F/kT}/e^{\Delta F/kT} = e^{\Delta F/kT}</math></p> <p><math>\sim \text{statistical physics of equilibrium systems:}</math></p> <p>partition function: ensembles: canonical/grand</p> <p>canonical = chemical (grand) <math>e^{-\beta H + \beta A \zeta}</math></p> <p>grand canonical/grand canonical = canonical</p> <p><math>e^{\mu N/kT}/e^{-E\psi(x) - \mu N\psi/kT} = e^{-F/kT}</math></p> <p>(basic formula of statistical thermodynamics)</p> <p>[<math>\sim</math> e.g.: synergetics] <math>\{Z = 1\}</math></p> <p>canonical/canonical = grand canonical</p> <p>grand: canonical/canonical = canonical</p> <p>canonical/canonical = canonical</p> <p><math>e^{\Delta E_i/kT}/e^{F/kT} = e^{-F/kT}</math></p> <p>e.g.: statistics:</p>	
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		<p>classical: Boltzmann/Gibbs = Gibbs  quantum: Bose-Einstein, Fermi-Dirac  quasi particle: quasi: fermions/bosons = bosons  (e.g.: electrons/plasmons = phonons  <math>\sim e^{i \mathbf{k} \cdot \mathbf{r}}</math> (Fermi liquid: plane wave)/<math>e^{i \omega t} = e^{-\hbar \omega / k T}</math>  (bosons: <math>e^{\beta \epsilon_{i,s}} / e^{i \omega t} = e^{-\hbar \omega / k T}</math>)]  ~ statistical physics:  equilibrium systems/non-equilibrium systems  = thermodynamics  {e.g.: Boltzmann,  <math>e^{\Delta E_i / k T} / e^{i t L} = e^{-F / k T} \sim e^{-\Lambda t}</math>  [partition function/projection operator methods  (Robertson formalism ~ Prigogine) = equilibrium ~  irreversible processes]}  ~ logarithmic:  spiral/normal distribution = normal distribution  ~ vibrations:  interference of vibrations: harmonic (Fourier)  analysis: complex form: harmonic vibrations:  <math>e^{j k \omega t} / e^{j k \omega t} = e^{-j k \omega t}</math>  coefficient (<math>s^{-1}</math>): rise <math>\sigma</math>/decay <math>\delta</math> = decay  <math>e^{\sigma t} / e^{\delta t} = e^{-\delta t}</math>  functions: hyperbolic/exponential = logistic  hyperbolic (~ exponential): <math>\frac{1}{2} \cdot e^x + e^{x/2} \cdot e^x - e^x</math>  (~ complex numbers) [~ trigonometric functions:  <math>\cosh x / \sinh x = \cosh^2 x - \sinh^2 x = 1</math>]  e.g.: decay (~ rise): transcendental function:  hyperbolic/exponential = logistic  decay coefficient: <math>\sigma</math>: <math>&lt;0/&gt;0 = 0</math>  [~ vibration: decay/rise = constant amplitude (special  case: <math>s = j \omega</math>)]  processes: reversible/irreversible = stationary  eq.: hyperbolic/parabolic = elliptic  ~ scaling laws: <math>e^t / e^x</math> (~ Euler constant <math>\gamma</math>) = <math>e^{-\lambda t}</math>  [~ <math>e^t / e^t</math> (~ <math>\gamma</math>) = <math>e^{-t}</math> (~ <math>\gamma</math>)]  {~ <math>e^{\lambda v} / e^{\lambda t} = e^{-\lambda t} \sim e^{(i) \lambda v} / e^v = e^{-v}</math>}  ~ Euler: <math>e^{i \pi} / e^{i \pi} = e^{-i \pi} \sim -1 / -1 = 1</math>  ~ <math>e^{i \varphi} / e^{i \varphi} = e^{-i \varphi} \sim \text{angular: } 180^\circ / 180^\circ = 1</math> (~ <math>360^\circ</math>)  [<math>e^{i \pi} \cdot e^{-i \pi} \sim e^{i \pi - i \pi} = e^{2 \pi}</math>]  {~ Euler identity: <math>e^{i x} / e^{i x} = e^0 = 1</math>}  ~ mathematical constants:  unspecified constants: <math>e^x / e^x = e^{-x}</math>  (eq.: differential/integral = integro-diff.)  ~ Riemann conjecture:  Riemann-Siegel theta function: Gram point ~ Gram's  law: <math>e^{i \theta(t)} / e^{i \theta(t)} = e^{-i \theta(t)} + e^{i \theta(t)} = 0</math>  [~ <math>I/II = II + I</math> (= <math>III</math> ~ logistic function)  (~ <math>e^{i \pi \theta(t)} / e^{i \pi \theta(t)} = e^{-i \pi \theta(t)} + e^{i \pi \theta(t)}</math>) [~ Mill's constant <math>\theta</math>]]</p>	
absolute ~ objective	<i>Newton</i> (classic)	<i>Lorentz</i> (classic)	<i>Maxwell</i> (classic)
quasi: (absolute ~ relative)	<i>Leibniz</i> (relational)	<i>Lorentz</i> (classic)	<i>Schrödinger (QM)</i> <i>QED</i>
relative ~ subjective	<i>Einstein</i> (RT)	<i>Planck</i> (quantization process) [iteration method]	<i>Navier-Stokes</i> <i>QT</i>

~ Cartesian coordinates:

normal distribution [parameter:  $\mu$  (expectation value),  $\sigma$  = variance (standard deviation)]:  
 $y$  = probability for nature of life [life max. ~ opt. (=  $x_4$ )]/ $x_n$  = % (~ gradient or degree of) symm.  
{perfect:  $x_1 = 100\%$  [ $\mu - 3\sigma$ ], imperfect:  $I: x_{2(\text{interval: } 1-2)} = \text{symm.} < 100\%$  [ $\mu - 2\sigma$ ],  
II a:  $x_{3(\text{interval: } 2-3)} = \text{quasi } [\mu - \sigma]$ , II:  $x_4 = \text{stationary: turning point (opt.: quasi } \approx \text{dis = fuzzy) } [\mu]$ ,  
II b:  $x_{5(\text{interval: } 4-5)} = \text{dis } [\mu + \sigma]$ , III:  $x_{6(\text{interval: } 5-6)} = \text{asymm.} > 0\%$  [ $\mu + 2\sigma$ ],  $x_7 = 0\%$  (perfect asymm.)  
[dimensionless quantities: gradient  $\Delta y / \Delta x$  (angle  $\alpha^\circ$ ), relative quantity %, degree of (angle  $^\circ$ ) ]}

<i>quantities:</i>	<b>m</b>	<b>I</b>	<b>E</b>
<b>matter</b>	<i>law of conservation</i>	<i>dto. (momentum)</i>	<i>dto.</i>



<b>set</b>	<i>particles (fermions)</i>	<i>quasi particles</i>	<i>particles (bosons)</i>
<b>sphere</b>	<i>waves</i>	<i>dto.</i>	<i>dto.</i>

<i>quantities:</i>	<b>space</b>	<b>space ~ t</b>	<b>t</b>
<b>matter</b>	<i>Wave (de Broglie)</i>	<i>dto.</i>	<i>dto.</i>
<b>set</b>	<i>particles (fermions)</i>	<i>quasi particles</i>	<i>particles (bosons)</i>
<b>sphere</b>	<i>waves</i>	<i>dto.</i>	<i>dto.</i>

<i>quasi-metric:</i>	<b>m</b>	<b>I</b>	<b>E</b>
<b>matter</b>	<i>atom, molecule</i>	<i>crystal momentum</i>	<i>eigenangle, enthalpy</i>
<b>set</b>	<i>fermions</i>	<i>Particles</i>	<i>bosons</i>
<b>metric</b>	<i>wave</i>	<i>harmonic vibration ~ wave</i>	<i>wave</i>

~ Arbitrarily: (large, small, long, approximate, exact, randomly)[~ asymptotical]: iteration/approximation = limiting (~ lim)

~ life: degrees of: freedom/bond (~ binding) = interaction

e.g.:

↑complexity: ↑freedom/↑bond = ↑interaction (stationary: opt. = 1)

{complexity: chaotic s: weak coupling: synchronic

[e.g.: hearth frequency mother ~ embryo ≈ indian monsoon ~ el nino,  
natural (~ life) rhythm: chronobiology etc.]}

digital signals: synchronic/asynchronic = isochronic

~ life: essence/evolution = nature:

e.g.:

crystals: periodical/aperiodic = quasi ~ periodical decimal numbers/ $\pi$  or aleatory quantities

~ nature: periodic repetition of the ever equal structure of molecules/aperiodic

[~ Schrödinger: structure of nucleic acids in the living cells ~ aperiodic solid (crystal): DNA, gene]

~ Schrödinger: process: order: order from order (negentropy) [miniature code: genetic code]/order from disorder (entropy)

~ state: order/chaos ~ coherence/incoherence ~ time (~ coefficient): decay (~ damping)/rise

~ periodical/non periodical = quasi periodical

{~ order from chaos: Riemann's conjecture (hypothesis):

e.g.:

Riemann zeta-function  $\zeta(1/2 + it)$ : critical line  $Re(s) = 1/2$ : part: imaginary/real  $\approx 0/0 = 1$  (stationary: opt.)

normal distribution: probability:  $1/0 = 1/2$  ( $\mu$ )

(first non-trivial zeros at  $Im(s) = \pm 14,135; \pm 21,022; \pm 25,011; \dots$ ) [ $i\pi/2 = 1/2 + \epsilon$ ]  $\{1/2 + 14,135/1/2 - 14,135 = 1\}$

Riemann-Siegel theta function: Gram point ~ Gram's law:  $e^{i\theta(t)}/e^{i\theta(t)} = e^{-i\theta(t)} + e^{i\theta(t)} = 0$

(~  $e^{i\pi\theta(t)}/e^{i\pi\theta(t)} = e^{-i\pi\theta(t)} + e^{i\pi\theta(t)}$ ) [~ Mill's constant  $\theta$ ]

order/chaos = weak (deterministical) chaos (e.g.: quantum chaos: quantum billard)

[~ zeros/prime numbers  $\approx$  prime numbers = zeros = waves ( $\approx$  quasicrystal)]]

~ physics:  $t/\text{space}/\text{space}/t = t^2/\text{space}^2 \sim s/m^3$  (spectral density of vibrational modes  $g$ )/ $m^{-1}/s = s^2/m^2$  ( $1/v^2 \sim m/E = I$ )

algebra/topology/geometry/number theory = analysis

~ mathematics:  $\text{space}/t/t/\text{space} = \text{space}^2/t^2 \sim m^{-1}/s/s/m^3 = m^2/s^2$  ( $v^2 \sim E/m = I$ )

[Hamilton: function  $H \sim$  operator  $\hat{H}$ /hermitian conjugate  $X^H = v^2$ ]

topology/algebra/number theory/geometry = analysis ~ discrete/discrete/discrete/continuous = continuum

⇔ ~

Phenomenon: conceptions/views = perceptions

e.g.:

thermodynamics  $\approx$  phenomenological thermodynamics:

Onsager: formalism: reciprocal relations: entropy production (min. ~ Prigogine):

phenomenological: relation: coefficient

statistic physics of equilibrium systems: phenomenon: cooperative ~ collective

[e.g.: Gurwitsch: mitogenetic radiation (~ biophotons): cooperative phenomenon ~ collective states]

sign: symbols/metaphors = analogy (~ e.g.:  $\alpha/\Omega = \zeta \sim \mu$ )

mathematics: symbols/metaphors = ~ [e.g.: finite/transfinite = infinite ~ structures/programs (concepts) = relations]  
     geometry (~ topology): algebraic/analytic = diff.  
     ~ geometric algebra/algebraic geometry = algebraic diff. geometry  
     algebra: elementary/abstract (~ modern) = general (~universal)  
     ~ algebraic geometry/universal algebraic geometry = variety (of)  
 number theory: elementary (~ arithmetic)/algebraic (~ geometric) [~ arithmetic geometry] = analytic  
     ~ algebra (~ number theory)/geometry (~ topology) = analysis  
 periodic system: chemistry ~ QM: charges: protons + neutrons/electrons = atom  
     (~ proton/electron = neutron)  
 ~ spin: antisymmetry: fermions: Pauli principle: atom: quarks (QCD)/electrons (except H) ~ e.g.: H/He,...  
     [nucleus: quarks number: 3/2, 4,... ~ Pauli principle: +/-non]  
 {~ less fermions = non chemistry ~ less fermions + bosons = non life ~ less asymm. + symm. = non life}  
 physics: UT: symm./asymm. = fuzzy: motions (~ rest): particles (~ waves): bosons/fermions = I: forces/matter = a  
     a [~ units: N/m = m/s<sup>2</sup> (~ N/E = m<sup>-1</sup>)]  
     ~ motion/rest: e.g.: QT: special/generalized = general: motion ~ rest/motion/rest = motion-rest  
     ~ QIT: special/generalized = general: e.g.: Q: probability/fuzzy = approximate  
         I: motion/rest = move(ment)  
     ~ mathematics: coordinates: algebra (function)/geometry = analysis (infinitesimal calculus)  
         artificial intelligence: self/reality = embodiment  
         philosophy: terms/pictures = picture terms ~ term pictures  
     ~ conceptions/intuitions = intuitive conceptions ~ conceptual intuitions (e.g.: metaphors)  
         ~ wisdom: truth/goodness = sympathy ~ convention/universals (~ Hegel)  
     (~ Kant: theory of perceptions: "thought without content are empty, intuitions without conceptions are blind")  
         ~ e.g.: perception: eidetics, synesthesia, savants, gifted, hypersensitivity  
         ~ love: wisdom/nature = life ~ philosophy/nature éros = vital éros  
 mind: spirit/soul = feeling [~ e.g.: lógos/cosmos = éros and agápē ~ noetic/(meta) intuition = (hyper) sensible]  
     ~ state of mind/frame of mind = mood of mind  
     ~ languages/senses = mind (~ e.g.: culture/nature = life)  
     ~ enlightenment: sciences/spirituality ~ cognitive/meditative ~ relative/absolute  
         ~ perception: senses/extrasensory = sensory  
     ~ behaviour: rational/non rational = irrational ~ e.g.: person  
         ~ taste: words/pictures = sound  
     mind (~ soul ~ body): culture/nature = life ~ human being: machine/nature = life  
 [~ culture mind: little/big = practical ~ special/universal = applied ~ coarse/sensible = labile (~ metastability)  
     ~ mass/nature = life ~ naive/complex = fragile ~ primitive/genius = amorph]  
 love: mind/soul = body ~ platonic/peace and quiet = happiness ~ ancient greek: philía/agápē = éros  
     values: meaning/areté (~ virtuosity) = eudaimonia ~ equal/free = fair (~ just)  
     [justice: culture/nature = life ~ e.g.: culture: high society (~ upper class)/caste = bourgeoisie]  
 ~ Apollonische Weisheit: "gnōthi seauton" (Delphi)/"eí" = "medèn ágan" (Delphi) ~ culture/nature = life:  
     peace ~ quiet: mind/soul = body ~ lógos/cosmos = éros ~ areté/agathón hexis = eudaimonia  
     [~ e.g.: eudaimonia: Kyrenaiker/Kyniker ~ hedonists/modest in one's needs (demands) = moderate]  
         ~ kósmos: nóētos/essentia = energeia ~ entelecheia  
     ~ Mundus: intelligibilis (~ philosophia perennis)/archetypus = sensibilis [opt. = harmonia (~ e.g.: Platon)]  
 culture: symm./asymm. = partial symm.: logic/non logic = alogic ~ moral/unmoral = amoral ~ ethic/unethic = partial ethic  
     ~ e.g.: state/market = money (neutral) ~ materialists: poor/rich = middle class  
         [~ m: inertial ~ gravitational (tumbe ~ blind)]  
     ~ culture/nature = life: consume/useful = utility ~ hedonistic/naturalistic (e.g.: Kyniker) = vitalistic  
         ~ culturalist/naturalist = vitalist: reason/ataraxie = affects  
         ~ commercialism/re commercialism = non commercialism  
     ~ orientation: ex: ante > post/ante < post = ante ~ post (opt.: ante-post)  
     - principle: opt.: degree: sustainability (~ efficiency): productivity/efficient = sufficiency  
 [~ use (creative power) [economy principle: max./min. = opt.]/action (exergy) = sufficient (eco ~ self)  
     evolution: brain: - grisea substantia (grey matter): selection/variation ~ puberty/end of childhood  
     - intelligence: age: older/younger ~ crystalline > fluid (~ wisdom and intuition)/crystalline < fluid  
         - intrinsic activities: functions: visual/Default Mode Network (DMN) = motoric  
     - music: singing: individual: ratio ~ emotion/↓aggression ~ ↑serotonin = harmony  
         - cerebrum/cerebellum = -stem  
     sciences: reality/possibility = probability (~ e.g.: medium)  
     ~ reality/Wirklichkeit ~ matter/Q ~ catch on/mind ~ manipulate/emergence ~ substantive/adjective  
     ~ knowledge: natural science/responsibility ~ instrumental/understand ~ reductionistic/synergy  
         ~ economy: homo: oeconomicus/sapiens ~ competition: conflict/creative  
     ~ mathematics: numbers: real/complex = prime (~ e.g.: physics: classic/Q = Q chaos ~ thermodyn.)  
     nature: processes: reversible/irreversible = chaotic behaviour (turbulence: e.g.:  
         numbers of dimension 1) ~ mathematic model: dynamical systems

{ chaos: determin./Q = thermodyn. (~ e.g.: ergodic theory): equations:  
 Navier-Stokes diff./Hamilton integral = Navier-Stokes generalized solution ~ stationary: e.g.:  
 bifurcation ~ self-organization (structure formation)  
 ~ number of dim. 1/dimensionless constant = dimensionless number  
 e.g.: Reynolds/h =  $R_{(H)} \sim 1/1 = 1$  (~ Riemann  $\zeta$ -function) [~ unit: circle ~ ball]  
 ~ physics: classic/Q = chaos (Rydberg atom) ~ thermodyn. (Reynolds number) [~ e.g.: c/e = Feigenbaum]  
*friction*: classic: force ( $F_R$ ): internal/external = turbulent (laminar fluid/solid = air)  
 ~ classic/Q = thermodyn.: energy  $E_R$  (~  $E_{th}$ ) ~ dim. 1:  $\mu(f)/R = Re$ :  
 friction coefficient/Rydberg frequency ( $cR_\infty$ ) = Reynolds number: dim.: 1/less = 1 ~ opt.:  $1/1 \cong 1$   
 $m/E = I$ : e.g.: friction:  
 coefficient per mass unit  $\gamma$ /free  $E$   $F \sim$  enthalpy  $G \sim$  exergy  $W_E \sim$  heat quantity  $Q =$  specific free:  
 $E$  (~ enthalpy)  $f$  (~  $g$ ) [specific: enthalpy  $h \sim$  internal  $E_u \sim$  heat quantity  $q \sim E Y$ ] ~ dose: absorbed  $D \sim$  equivalent  $H$   
 ~ [constant  $r$  (coefficient)/m]/ $E_{th} = v^2$  }  
 $E$ : motion/rest ~ kin./pot. ~ bound/free ~ vector/scalar = relaxation [e.g.: vibration relaxation ~ (hyper) virial  
 theorem: stars: internal (thermic)  $E_i$ /gravitation  $E_g = E_{tot}$  (hydrostat. equilibrium)  
 ~ physics: classic/Q = thermodyn.]  
 ~ vector. free kin. motion/scalar bound rest potential = motion-rest approximation  
 (e.g.: photon ~ Q: rest:  $m \sim E$ ) [~ stationary: opt. = 1] {~ set: bound:  $E/I = \text{sign}$  }  
 mathematics (~ sciences): culture/nature = life ~ conditions: initial/(initial-)boundary = side  
 {~ nature: processes: s: degrees of freedom/dimensions = interactions [stationary (opt. = 1)]}  
 ~ mathematics: PDE (~ ODE)/nonlinear = nonlinear PDE  
 ~ values: true/real = analogue (~ estimate/limited = threshold) ~ surreal/real = unreal  
 ~ probability/fuzzy = approximation/regulation = complementary  
 (~ special: logic: fuzzy: probability/many-valued = approximation)  
 probability: degree of certainty/degree of chance (stochastic ~ probability theory) = uncertainty ~ ignorance coefficient  
 probability theory: classic/QM = generalized  
 probabilistic (stochastic): wider: statistic/combinatorial = probability theory  
 xýnevolution level: independence/(degrees of) freedom = (degrees of) interrelation ~ (inter)dependence  
 (~ constraint) [~ e.g.: culture/nature = life ~ wisdom/character = behaviour]  
 prime numbers: algebraic topology/analytic geometry = algebraic diff. topology (~ geometry)  
 [e.g.: graphs theory/diff. geometry = manifolds (e.g.: schemes, non commutative geometry, symplectic geometry)]  
 qualities (~ characteristics): symmetry/asymmetry = fuzzy symmetry  
 (~ e.g.: mathematics: manifolds/diff. algebraic topology = algebraic diff. topology  
 ~ group theory/geometry, sets theory = fuzzy sets theory)  
 $I$ : logic/intuition = sensual (~ e.g.: ~/ $\odot$  = ♥ ~ culture/nature = life)  
 formation (~ structure): organism/species = genus [e.g.: individual, system/atoms, molecules = fauna, flora]  
 culture: administrators/creators = coordinators  
 ~ fundamentalist/opportunist = fundamental opportunist ~ opportunistic fundamentalist  
 ~ bureaucrats, technocrats/inventors, discoverers = innovators  
 ~ organisations, institutions/ideas, creative = NGOs, initiatives, action groups  
 ~ psychology: specialist/power people (politician) = manager ~ entrepreneurs  
 ~ governmental s: federal state/confederation of states = hybrid form ~ e.g.: USA/German confederation = EU  
 mathematics: relations ~ probability:  
 $\pm\infty/\pm\infty \sim \pm \text{nothing}$  (0)/ $\pm \text{nothing}$  (0) ~  $\infty+3/0+3 \sim \infty\cdot\infty/0\cdot0 \sim 0/0/\infty/\infty \sim \infty/-\infty \sim 0/-0 \sim \infty/0 \sim 0/\infty \sim \infty-\infty/0-0$   
 $\sim (\pm\infty)^0/(\pm 0)^0 \sim 1^{\pm\infty}/0^{\pm 0} \sim a/0/a/\infty \sim \infty+\infty/0+0 \sim \dots = 1$   
 pattern: mathematics: discrete/continuous ~ rest/motion ~ static/dynamic ~ geometry (~ topology)/analysis = algebra  
morpho: matics/metrics = genesis  
 ~ e.g.: parameter/number value = gradient  
 (~ e.g.: quantity: *symmetry number s/asymmetry parameter K* = concentration)  
 ~ nature: motion/rest = rest motion ~ processes/states = state process(es) [e.g.: Markov process]  
 (~ e.g.: mathematics: analysis/states equations = partition function)  
 ~ form (~develop): pattern/shapes (forms) = complexity  
 ~ mathematics: manifolds/algebraic (diff.) topology = algebraic (diff.) geometry [~ e.g.: quantity/quality]  
 {~ pattern, regularity and structure/non pattern, regularity and structure = fuzzy pattern  
 (e.g.: number theory:  $e^{in}/\pi$  = prime ~ physics:  $e^s$ /fundamental constants = concentration gradient)}  
 ~ s: discrete/holistic = synergetic  
 ~ culture/nature = life: e.g.: freedom/essential = interaction ~ complicated/elementary = complex  
 - cause and effect relationship: principle: proof/liability cause (~ party responsible) = moderate  
 ~ dimensionless quantity: *symmetry number s/asymmetry parameter K* = degree of symmetry (~  $1/1 = \%$ )  
 ~ concepts/categories = features (e.g.: criteria) [~ morphogenesis (e.g.: neurogenesis)]  
 ~ culture: linguistics: concepts/values = conceptions  
 ~ numbers:  $12/13 = \mathbb{N}$  ~ sublime/prime ~ semi perfect/golden ratio (canonical approximant:  $5/8, 8/13, 13/21$ )

~ platonic bodies/Fibonacci (5, 8, 13, 21)  
 ~ e.g.: atoms ~ molecules:  $^{12}\text{C}/^{13}\text{C} = {}_6\text{C} \sim {}^{24}\text{Mg}/^{25}\text{Mg} = {}_{12}\text{Mg} \sim {}^{23}\text{Na}/^{25}\text{Mg} = \text{N}$  (neutron number)  
 ~ resonance: Q (quality) factor (dimensionless parameter)  $Q: > \rightarrow 1/2 / < \rightarrow 1/2 = 1/2$  (~ opt.)  
 ~ resonant: rise/fall ~ feedback: positive/negative ~ circulus: vitiosus/vice versa = logistic function  
 [ $\sim \delta \geq \omega_0/\sqrt{2}$  (great damping, little quality)/ $\delta \ll \omega_0$ ,  $\omega_r \approx \omega_0$  respectively  $\hat{Z} \approx \hat{Z}_0$  (little damping, high quality)]  
 {~ equivalent (~ organ) dose:  $H = Dq$  (~ Sv = J/kg ~ m<sup>2</sup>/s<sup>2</sup>)  
 [~ equivalent dose rate:  $\dot{H} = \dot{D}q$  (~ Sv/s ~ W/kg ~ m<sup>2</sup>/s)] ~ e.g.:  $H/\dot{H}$  = resonance frequency  
 ~ e.g.: harmonic vibration ~ carbon resonance ~ energy level ~ Riemann conjecture  
 ~ (dyn.) s: structural: stability/instability (bifurcation) = relaxation (inverse resonance effect)  
 ~ manifolds: stabil/instabil = centurms [~ bifurcation: enslaving-principle (~ relaxation: enslave)]  
 ~ qualitative: change of (in) state/properties = in the plane: behaviour: stationary point surround linear s  
 ~ bifurcation: change of state/manifolds = deterministic chaos ~ symmetry breaking ~ logistic: eq. ~ map  
 ~ dynamic state(s): resonance/relaxation = bifurcation ~ e.g.: steady state  
 ~ steady state: culture/nature = life  
 ~ I: actual/pot. = efficiency (~ e.g.: pragmatic) [stationary: opt. = 1 (~ steady state)]  
 dim./measurement = efficiency ~ e.g.:  $D_1/S/-S$  = mutual ~ trans (~ synergety) [~ interaction (~ synergy)]  
 ~ formation: ex/in = trans (stationary: opt. = 1)  
 ~ biology: selection/variability ~ adaptation/modification and mutation  
 ~ symbiosis: in strict sense/in wide range = selective  
 ~ interactions: (eusymbiosis/protocoop. = mutualism)/(mutualism/parasitism = commensalism ~ neutralism) =  
 (selection: co-evolution/combate, predation or competition = symbiogenesis)  
 ~ symbiont. mutualism/non symbiont. mutualism = mutualistic symbiosis  
 ~ equilibrium: real/steady state (~ homoeostatic) = dyn. [~ s: closed/open = partial open]  
 ~ theory: s/I = complexity  
 ~ culture: sustainable: materialisation: de/annihilation [ $> \text{C2C}$  (cradle to cradle)] = re  
 ~ e.g.: germany/south countries (~ india) = east asia  
 ~ economy: culture/nature = life ~ e.g.: efficiency/sufficiency = sustainability (~ steady state)  
 ~ e.g.: (opt.) *marginal utility* (Gossen law) ~ food: spirit/mind = body  
 ~ efficiency: culture/nature = life  
 ~ e.g.: egocentric (~ selfish)/altruistic = egoistic ~ self-: realization/liberation = development  
 functional (analysis): diff./integral = integro-diff.  
 ~ e.g.: extremum principle (Lagrange function)/Feynman (path) integral, Wiener integrals, Onsager-Machlup fct. = evolution eq.  
 ~ s: autopoiesis: self-organisation: authenticity/spiritual = sovereignty  
 ~ nature: processes: degrees of freedom/interactions = nonlinear PDE  
 ~ e.g.: fractal dim.  $d$ /Boltzmann constant  $k/-k$  = Navier-Stokes DE  
 ~ I dim.  $D_I$  (~ multifractals: global dim.  $D_1, \dots$ )/ $S/-S$  = attractor  $\mathcal{A}$   
 ~ I: degrees of freedom/rules = interactions  
 ~ e.g.: evolution equations: diff./integral = integro-diff. ~ O(P)DE/functional = non linear  
 ~ knots theory (topology): (algebraic) number theory/algebraic topology = geometry  
 ~ e.g.: rings and elliptic curves/loops to groups = curves ~ elliptic curves/manifolds = curvatures  
 ~ regular prime/QFT (Witten ~ Jonespolynom), string, superstring (knotted loops), DNA = [force (interaction) = curvature]  
 ~ Fermat's last theorem/Poincaré conjecture = Gauß surface theory (e.g.: theorema egrigium)  
 geometry: algebraic (special: algebraization of the modern algebraic geometry)/manifold = diff.  
 ~ e.g.: Diophant/modern physics (~ Leibniz) = theoretical mechanics (Lagrange, Hamilton and Jacobi)  
 ~ algebraic: number theory/(diff.) topology = (diff.) geometry  
 ~ topology: general or set theoretic: algebraic/geometric = diff. ~ e.g.: knots, manifolds  
 ~ sets: algebraic/topologic = manifold  
 ~ primes: exponents ~ numbers:  
 {[Fermat's last theorem: regular  $\sim e^{-1/2} \approx 61\%$  (~ golden section:  $\phi^{-1}$ )/irregular] = 2} ~ Riemann conjecture  
 ~ pattern: number theory: algebraic/geometric = analytic ~ e.g.: conjecture: Fermat's/Poincaré = Riemann  
 ~ e.g.:  $f(z)/S^3 = \{(x_1, x_2, x_3, x_4) | 1/2^2 + 1/2^2 + 1/2^2 + 1/2^2 = 1\} = \zeta; (z) = 0 \sim it/2 \sim 1/2 + it$   
 ~ unsolved mathematic problems: e.g.:  $P = NP/P \neq NP$  = approximate:  $P \sim NP$  (~ opt.:  $P \approx NP$ )  
 ~ fallacy: e.g.: deductive/inductive = is-ought problem (Hume's law)  
 ~ sciences: methods: "more geometrico" (~ Euklid) ~ "ordo" (~ Descartes) ~ "mos geometricus" (~ Spinoza):  
 mathematicus/metrico = genus (~ e.g.: mathem.: algebraic/topologic = analytic)  
 ~ theoretico/empiricus = ~  
 ~ *phenomenon/noumenon* (the thing in-itself ~ thing ~ object) = approximation  
 ~ e.g.: culture/nature = life:  
 [conceptions (~ interpretations)/mathematics = theory]/[dim.: max./min. = middle] = stationary (opt. = 1)  
 ~ (superstructure/basic = phenomenon)/(dim.: macro/micro = meso) = stationary (opt. = 1)

~ [laws: movement/rest (~ democratisation of sit) = opt.]/[rules: movement/rest = opt.] = steady state  
 ~ {s (~ ego) [discrete]: virtue (e.g.: Buddhism = process ~ movement)/vice (e.g.: Buddhism = state ~ rest)/  
 e (~ non ego) [holistic]: virtue (e.g.: Buddhism = process ~ movement)/enlightenment (e.g.: Buddha = state ~ rest)}  
 ~ genetic/epigenetic = both  
 ~ (s ~ e): production:  $\Delta\uparrow\%$  (transformation: quantity  $\Rightarrow$  quality): min. S/min.  $-S = \text{opt.}$  xýntropy  
 [~ quantity > quality/quantity < quality = opt. (quality ~ quantity)]  
 evolution: cultural/natural = vital ~ mind/soul = body:  
 e.g.: mind: reason: cultural/natural = life: pure/practical = critical (~ emotion ~ soul)  
 evolution biology: behaviour programs: dominance/stimulance = balance  
 (e.g.: condition: selective perception of brain) ~ condition/decondition ~ breeding/accident  
 ~ power/powerlessness ~ producer/consumer ~ values: economic/non-material  
 ~ nano: particle: metabolism/immune defence = neutral  
 e.g.: cancer: mathematic opt. form:  $\frac{1}{2}$  coconut (~ fullerene, graphene)  
 ~ culture: world explanation: models: eidetic narrative/science ~ non contingency/contingency  
 ~ religion/physics = metaphysics ~ phenomenological/positivism ~ cognition: sense: broader/narrow  
 ~ thought/epistemology  
 behaviour: global/local = lobal (~ glocal)  
 t-space: culture/nature = life ~ e.g.:  $t_p$ /half-life = relaxation  
 truth: culture/nature = life  
 ~ e.g.: sciences: models ~ methods: culture/nature = heuristic/intuition = perception (~ senses)  
 [~ models: ceteris paribus (c.p.): real/mental = heuristic ~ e.g.: diff./integrate = integro ~ diff.]  
 ~ scientific modelling: model: box: White/Black = Grey  
 ~ philosophy: being ~ essence: e.g.: movement/rest ~ act/pot. ~ abstract/concrete ~ universal/individual  
 ~ one/many ~ logos/reality ~ Parmenides/Herakliteer = Aristoteles (~ Heraklit: logos, law/becoming, flux)  
 ~ Spinoza, Hegel/life (Nietzsche, Klages) ~ thought (~ sciences ~ rationalism)/senses  
 mathematics: operation: associative/non-associative = non-associative  
 logic/sets = relation  
 structures: algebra: abstract/universal (~ general) = special abstract  
 ~ e.g.: group/operation = composition  
 algebra: algebraic structures/topologic facts = number domains  
 ~ universal algebra/category theory = operation  
 mathematic: structures: special/basic = multiple (in a set ~ Bourbaki)  
 order/topologic = algebraic, number domains and geometric (~ operations and axioms)  
 relations: symmetrical/asymmetrical = transitive  
 relation: operations/relations = mapping  
 s: equilibrium: dyn. (~ stationary): thermo/non-equilibrium = steady state (~ homoeostatic)  
 ~ e.g.: physics, chemistry, biochemistry, thermodynamics, biology, ecology, economy (~ market), sociology  
 ~ balance/non-balance = imbalance  
 ~ harmony/non-harmony = anharmony  
 ~ synchron/non-synchron = asynchron (~ isochron/anisochron)  
 [~ e.g.: synchronizing: rhythmus: culture/nature = life]  
 ~ e.g.: logistic function:  
 point: upper/lower = middle {~ saddle/saddle = turning (stationary)}  
 ~ value: threshold/threshold = opt. (e.g.: chemistry: equilibrium constant K:  $>1/<1 = 1$ )  
 ~ limiting/limiting = limiting (lim.  $\rightarrow 1$ ) [e.g.: K:  $>>1/<<1 \rightarrow 1$ ]  
 (~ extreme: max./min. = minimax ~ limiting/threshold ~ threshold/limiting)}  
 decision theory: uncertainty (~ danger): uncertainty/ignorance = risk ~ e.g.: measure: probability:  $0,3/0,2 = \frac{1}{2}$   
 E: constant/sinking ~ law: 1. thermodyn./cosmic ~ s: closed/open  
 (~ S: constant/non constant ~ 2. thermodyn. law: s: closed/closed ~ process: revers./irrevers.)  
 measurement problem: classic ~ QM: inaccuracy relation ~ uncertainty principle (Heisenberg):  $\Delta f = 1/\Delta t \sim E = hf$   
 light: particle ~ wave:  $E = hf + p = hf/c \sim f + \lambda = c/f = h/p$  ( $Ef = h$ : proportional:  $E \sim f$ : proportional constant  $h$ )  
 {Heisenberg: relation: energy-time [Et:  $\Delta E \Delta t$  (~ lend: E amount · period)] ~ uncertainty: position-momentum (mp) =  $h$ }  
 bosons: rest: m ~ E: micro/macro ~  $>0/<0$  = Higgs  
 alpha decay: half-life: nucleosynthesis (stellar ~ big bang ~ supernova): asymm.  
 E: level: max./min. = opt. ~ motion/rest ~ e.g.: electron  
 eq.: operator (pot.) = source/operator = source (pot.)  
 ~ physics: Classic/GRT  
 {~ logic: monoton/non monoton (~ assumption: non default/default = kognition) [~ method: traditional/heuristic]}  
 ~ matter  $\Rightarrow$  space/matter  $\Leftarrow$  space-t (metric) ~ field: dyn./dyn. ~ EM/RT ~ grav./grav. pot matter/E = I  
 ~ vectorial/scalar ~ grav./antigrav. [~ Einstein: field eq.: grav. pot. + antigrav. term (~ grav. pot./antigrav. term)]  
 ~ field eq.: operator: divergence (field) = matter + grav. (E ~ m:  $E \Rightarrow$  gravitational m)  
 {~ diff. (grav. field  $\Leftarrow$  pot.) = matter ( $\Leftarrow$  metric term) [E + p = source of grav. field] + grav.}

~ field  $\Leftrightarrow$  field ( $\Leftrightarrow$  metric: pressure ~ (m) density ~ matter distribution) ~ tensor: metric field  $\Leftrightarrow$  E-p  
 ~ Classic/GRT ~ eq.: field + motion/field  $\Rightarrow$  motion ~ e.g.: Lorentz/Einstein  
 ~ action = source [~ field: cause (y = x)] {calculate: x = y} ~ Lorentz/Einstein ~ m: inertial/inertial  $\Leftrightarrow$  gravitational  
 ~ equation of motion:  $ma = F$  (~ charge · field) ~  $ma = \text{charge} \cdot \text{field}/ma = m \cdot \text{field}$  ~ inertial  $m \cdot a = \text{grav. } m \cdot \text{field}$   
 [~ m: inertial ~ gravitational  $\Rightarrow a = \text{field}$ ] {GRT:  $\Delta$ Classic: Lorentz): grav. pot.  $\Leftrightarrow$  non sources of the field}  
 ~ set: point/space ~ t/t ~ matter/I ~ field: quantity/pot. ~ force (interaction)/curvature ~ singularity/metric = analogy  
 ~ interaction: forces: equilibrium: attraction/repulsion = steady state (opt.: neutral)  
 ~ e.g.: micro/macro = meso ~ weak, strong/grav. = EM ~ G/Anti-G = centrifugal  
 (grav. ~ EM ~ weak ~ strong: micro ~ meso ~ macro: micro/macro = meso)  
 ~ e.g.: eq.: field: kin. = metric + pot. ~ kin./metric ~ vectorial/metric + scalar  
 (~ vector/scalar = tensor ~ motion/field = tensorial ~ motion/field/motion/field = tensor)  
 e.g.: grav./antigrav. = tensor ~ GRT/GRT = units ~ grav./grav. ~ cosmological constant  $\Lambda_A: <0/>0 = 0$   
 ~ (m ~  $E_{\text{kin}}/E_{\text{pot}}$  ~  $h\nu/h\nu = 1/v^2$  ~ neutrino/antineutrino (~ supersymm.)  
 ~ field: metrical/density ( $\text{kg}/\text{m}^3$ ) [~ measurement: m: natural constants: mol respectively h]  
 {~ mol ~ m ~ I ~ E: e.g.: molar volume: metric ( $\text{m}^3$ )/mol ~ molar m (mol m): m/amount of substance ~  $\text{kg}/\text{mol}$ }  
 ~ metrical/metrical term (E-p tensor)  $T_{\mu\nu}$  + metric  $\Leftrightarrow$  m ( $\kappa = 8\pi G/c^4 = 2,07 \cdot 10^{-45} \text{Ns}/\text{kg}^2\text{m}^2$ ) [  $\kappa T_{\text{ab(ik)}}$  ]  
 ~ metrical =  $8\pi G/c^4 \cdot T_{\mu\nu}$  (m distribution)  
 ~ field: interaction: vectorial/scalar = tensorial (~ e.g.: scalar ~ tensor ~ vector)  
 ~ RT: t: system/universal = proper  
 ~ ex course: culture: solution/problem ~ e.g.: tensor/scalar < s/s ~ t/t  
 Maxwell equations: 1884/1873 = 1864 ~ vectorial/quaternions (~ calculation: scalar and vectorial) = scalar + vectorial  
 ~ Heaviside (~ Gibbs ~ Hertz)/Maxwell = Maxwell  
 [~ tensor calculus/generalized Maxwell eq.: geometrical interpretation of the EM field as curvature of manifolds through  
 curvature of principal fibre bundle (gauge field th.) = Cartan's calculus of the alternating diff. forms]  
 ~ tensor algebra/diff. geometry = tensor analysis  
 ~ fields = charges + currents  
 [~ (medium of action and action) = (sources = originator) ~ medium of action/action = cause] {~ y = x [~ y/x = z]}  
 ~ homogeneous/inhomogeneous  
 ~ Einstein eq.: GRT  
 ~ Schrödinger eq.: waves  
 ~ RT  $\rightarrow$  Classic/RT  $\leftarrow$  Classic = Maxwell ~  $c \rightarrow \infty/v \rightarrow c = v/c$  (~ non dim.:  $v \Rightarrow cv$ )  
 ~ reference s: stationary/moving = Maxwell ~ uniform/accelerated (~ SRT/GRT) = Einstein  
 [~ Newton/Einstein = Maxwell]  
 ~ generalized: scalar: field: dimensionless density parameter:  $\Lambda_A: <0/>0 \approx 0$   
 ~  $\Omega_A: <0/>0 = 0 \sim \Omega_m/2$  (half m density):  $</> = 1$   
 e.g.:  $\Omega_A = 0,7/\Omega_m = 0,3 \sim \Omega_{\text{tot}}: >1/<1 = 1$  (spherical/hyperbolic = flat ~ K: +1/-1 = 0)  
 ~ world models: cosmos: closed/open = partial open (~ e.g.: approximate steady state)  
 ~ TOE: attraction/repulsion = cosmic microwave background (CMB) radiation (CMBR) [~ e.g.: concentric circles]  
 ~ e.g.: gravitation/antigrav. = 0 ~ neutral (~ stationary: opt. = 1): matter/antimatter = neutral matter  
 ~  $m/m_{\text{neg}} = m_{\text{neu}}$  ~ graviton/anti-graviton = graviton<sub>neu</sub> ~ field: vector/scalar = tensor  
 ~ matter/matter<sub>neg</sub> (~ e.g.: dark: m/E) = matter<sub>neu</sub> ~  $E/E_{\text{neg}} = E_{\text{neu}}$  ~ pulse /pulse<sub>neg</sub> = pulse<sub>neu</sub> ~  $I/I_{\text{neg}} = I_{\text{neu}}$   
 ~ biology: selection/variation = neutral theory of molecular evolution (e.g.: neutral mutation)  
 [~ ecology: neutral theories (e.g.: Unified neutral theory of biodiversity and biogeography: neutral organisms)]  
 ~ Paracelsus: tria prima  
  
 “Nur in einem unabhängigen Körper wohnt auch ein unabhängiger Geist + Seele“  
 (~ “.... kann .... wohnen”) [~ “... gesunden .....”] vice versa.  
  
 ~ target conflicts: culture/nature = life ~ e.g.: magic angle: market/state/sphere = phase ~  $5/4/n = 3$   
 ~ integrated sustainable triangle/Gibbs state diagram = Gibbs triangle  
 (~ stationary: opt.: equilibrium/equilibrium = equilibrium)  
 ~ order/chaos = oc ~ co (~ stationary: opt. = 1)  
 ~ quarks: culture/nature = life ~ particle [3 quarks (~ Joyce)]/3 quark families = 1. quark family  
 ~ e.g.: QCD: chirality  
 ~ physics: theory: parity symmetry (~ vector)/chiral ~ parity/parity violation  
 ~ non-chiral (achiral ~ amphichiral)/chirality ~ symm./asymm. = approximate symm.  
 ~ e.g.: Classic, QM, RT, QFT/Electroweak, QCD = Standard, CP  
 ~ mathematics: theory: knot  
 ~ e.g.: parity/chirality [~ non-chiral (achiral ~ amphichiral)]/parity violation = chiral parity ~ parity-chirality  
 (~ chiral symm.-parity asymm.) [~ parity symm.-chiral asymm.] {~ stationary: opt. = 1}  
 ~ values: material/immaterial = neutral ~ duality/unity = polarity (~ e.g.: either or/both and = either)  
 ~ dualistic/monistic = complementary  
 ~ science theory: analysis/synthesis = heuristic  
 ~ justice ~ fair(ness): cultural/natural = vital [~ justice/fairness = fair-justice]  
 {~ Liberté/Égalité = Fraternité (~ libertarian/egalitarian = fraternization)/balance = harmonic}

e.g.: ideal/real = pragmatic (~ Rawls/Naturalist = Sen)/equilibrium (~ poetic) = steady state (~ stationary: opt. = 1)  
 {Δ: e.g.: ideology ~ dictatorship (~ ism): money/people's = society/competitive = entropy}  
 ~ peace: cultural/natural = life ~ (freedom/equality = solidarity)/(harmonic/equilibrium = balance) = (true/good = beautiful)  
 [~ individual/collective = fair] {~ culture: peace: freedom/equality = solidarity ~ e.g.: personal/social = community}  
 ~ perception: appearance/being = seem ~ e.g.: culture/nature = life ~ illusion/intuition (~ serendipity) = imagination  
 ~ culture: death/natural = vital  
 ~ ideology: world view/neutral = critic  
 ~ circuit: entropy/negentropy = xýntropy  
 ~ cycle: culture/nature = life  
 ~ circulation: m/E = I  
 ~ life:  
 criteria: circuit(s)/circulation(s) = cycle(s)  
 ~ e.g.: (networking) control/matter = phases ~ economy: basic needs/sustainable (~ efficiency) = sufficient  
 ~ symm./asymm. = approximate symm. [~ symm.: more/less = more or less (opt.: approx. more-less)]  
 {~ stability/flexibility = elasticity}  
 ~ harmony/balance (~ equilibrium) = harmonic balance ( $\approx 0$ ) [~ e.g.: steady state] {~ stationary: opt. = 1}  
 ~ harmony/contrast = beauty  
 ~ harmony: true/good = beautiful (~ spirit/soul = body) ~ e.g.: behaviour ~ character ~ love  
 ~ legend (~ sagas)/myths = fairy tales ~ magic (black/white)/myths = mystic  
 ~ myths: Greek: Daídalos/Minotaurus = Theseus (~ e.g.: labyrinth: Dürrenmatt)  
 - epos: Sumer: Aruru/Enkidu = Gilgamesch  
 ~ believe (~ faith)/truth = confidence [~ culture/nature = life]  
 ~ belief: god/reason = confidence  
 ~ culture: quiet ~ silence/din = noise  
 ~ welfare: culture/nature = life (stationary: opt. = 1)  
 ~ serendipity: discoveries ~ inventions: prepared spirit/inspiration (~ chance) = transpiration  
 ~ insight phenomenon/analogy forming = creativity  
 ~ spiritus rector: spirit ~ mind: guiding/driving = invigorating ~ odem (~ átmán) [~ Átman] {~ life elixir}  
 ~ dynamical s: attractors: point ~ statically/chaotically ~ strange = periodical ~ cyclical ~ discrete/continuity = hybrid  
 uncertainty: metrology/fuzziness = uncertain  
 ~ harmonia: mundi/natura = vita(lis) [~ stationary: opt. harmony = 1  
 (e.g.: mathematics: knots, physics: harmonic oscillator, biology: enzyme: structures: bond strength/specificity = velocity)]  
 ~ optimization: fluctuations tolerance limit value level: threshold/threshold = turning point (~ e.g.: tolerance limit)  
 ~ questions: what/why = how [~ who/whereto (when ~ where) = whereby]  
 ~ action/cause: e.g.: big/little ~ max./min. ~ many/one (~ one/many)  
 [~ culture/nature = life: (little/big)/(max./min.) = (many/one ~ one/many)  
 ~ (min./max.)/(max./min.) = stationary (opt.)]  
 ~ conditions (complex): initial/boundary = side  
 {~ e.g.: big bang: symmetry/asymmetry = quantities of the free parameters ("natural constants")  
 [~ factors: evaluation ~ quality (biology) q: dose: equivalent H (Sv = J/kg)/energy D (Gy = J/kg) = q  
 ~ resonance: quality (physics) Q  
 ~ thermodynamics: intensive variable (parameter, quantity): e.g.: negentropy debt: specific entropy deficit:  
 specific entropy s per unit:  
 m: S/m (J/kg · K) ~ E: S/E (K<sup>-1</sup>) ~ volume: S/volume (J/m<sup>3</sup> · K) ~ t: S/t (J/s · K) ~ mol: S/mol (J/mol · K)]  
 ~ entropy/negentropy (~ E<sub>free</sub>) = negentropy debt (<-S) ~ specific entropy deficit (<-s) [stationary: opt. = 1]  
 ~ order parameter η ~ ζ: value: max. (1)/0 = >0 (stationary: opt. = 1)  
 ~ thermodynamics (equilibrium/irrevers. processes)/statistical physics of s in non-equil. = statist. physics: synergetics  
 ~ e.g.: Landau theory ~ extended Onsager formalism: time-dependent Ginsburg-Landau eq./functional Fokker-Planck eq. =  
 evolution eq. ~ Fokker-Planck eq. (integro-differential eq.) [~ wider: Master eq.,  
 theories: Langevin, Fokker-Planck, Percolation, Fractal, Dynamic s and Chaos  
 (⇒ ~ statistical thermodynamics chemical s and statistical theory of biological s)] {~ η/η = ζ}  
 ~ order/chaos = more or less approximate order ~ order/disorder = partial order  
 (~ e.g.: order: culture/nature = life)  
 ~ medicine: school/complementary (~ holistic) = integrative  
 ~ therapeutical/preventive = regenerative (stationary: opt. = well-being) [~ consciously/unconsciously = subconsciously]  
 ~ e.g.: physics: classic (Newton)/quantum = thermodynamics ~ matter/E = I  
 behaviour : compaction/leisure = balance ~ culture/nature = life (e.g. : space, t, E, I, matter, states, processes,...)  
 homo: essence: addiction/mangle = health  
 ~ e.g.: passion/suffer = equilibrium ~ greed, hatred, facing/pains = well-being ~ control/chance = uncertainty  
 ~ immune s: pathogen: bacterias/viruses = cells  
 ~ culture/nature = life: asymm./symm./symm./asymm. = approximate symm. ~ symm.: anti/non = Δ ~ e.g.: culture:  
 ~ suppression/entropic = passion ~ values: anything goes/limited = threshold ~ pluralistic/unit  
 ~ relativistic/objectivistic ~ freedom/non freedom ~ perfect : asymm./symm.  
 ~ conflict (Kleist, Freud)/consens = either ~ destructive/constructive = creative  
 ~ non conformistic/conformistic = critical ~ non resonance/resonance = dissonance ~ surreal/real = unreal  
 ~ society: capitalistic/communistic = life ~ optimist/pessimist = bipolar  
 ~ chances/dangers = risks ~ problems averse/problems ~ conservative/progressive = both (opt. = neutral)  
 ~ materialistic/immaterialistic = both ~ hedonistics/cynics = moderate

~ ethics: categorical imperative/golden rule = eudaimonia (~ should/will = can)  
 ~ duty/virtue ~ t: short/long ~ e.g.: Utilitarianism ~ Kant/Aristoteles  
 [Aristoteles: nicomachian: eudaimonia (> Glück): internal/external = mix ~ areté (> Tugend): s/e  
 ~ politics: opt.: aristocracy: experts/character = eudaimonia  
 ~ democracy: politeia: reason/public welfare = moderately well  
 ~ first philosophy: highest principles: substance: Einzeldinge (independent) > Seiendes (dependent):  
 form (function)/matter = exemplar (e.g. soul)]  
 ~ MQ (mind Q): intelligence/spiritual = emotional ~ culture/nature = life ~ e.g.: values: meaning/freedom = ethics  
 ~ skills (~ abilities): spirit/soul = body ~ e.g.: culture spirit/nature soul = life feeling  
 $\Leftrightarrow$  ~  
 ~ circuits/circulations = cycles: e.g.: specific entropy  $s/(E/m = I) = \text{phase} \sim S/m/c^2 = \text{angle} \sim <-S/m (<-s)/v^2 = \varphi$   
 ~ principle [~ efficiency (J/J = opt.)]: culture/nature = life  
 ~ e.g.: economic/ $E_{\text{use}}$  = exergy ~ Pareto/Sustainability = Sufficiency ~ units: J/J/J/J = J/J  
 (~ economic principle: max./min. = opt. ~ e.g.: profit)  
 development ~ progress: technical/evolutionary = human  
 ~ medicine: culture/nature = life ~ e.g.: health/disease = (self) healing  
 ~ truth/reality = true reality ~ real truth (opt.: true: real ~ satisfiable ~ constructive ~ right)  
 ~ confidence: basic trust/fear ~ indifference = mistrust  
 ~ e.g.: belief: culture/nature = life ~ religion/religare = religio  
 ~ obsolescence: culture/nature = life ~ e.g.: capitalism/decay = wear ~ fatigue  
 ~ justice: emancipation/democratisation = participation ~ freedom/equality = solidarity  
 ~ music: classic/modern ~ old/new = Officium Novum (Jan Garbarek)  
 ~ values: external/internal = steady state ~ e.g.: having/be = being ~ culture/nature = life  
 ~ t: term: short/long = middle ~ culture/nature = life  
 ~ e.g.: rise/half-life = mean ~ circuits/circulations = cycles  
 ~ space: spiral/meander = labyrinth  
 ~ acceleration/deceleration = velocity ~  $a/s^{-1} (v) = v$  [~ culture/nature = life]  
 ~ behaviour: árchein/anarchist (~ án-archos) = synergist  
 ~ culture: privat/public = public-privat partnership  
 ~ well: own/common = fair common-own relationship  
 ~ e.g.: goods (~ services): culture/nature = life ~ t: term: short/long = medium  
 [~ value: consumption/regeneration = use]  
 ~ efficiency: capitalism/action degree = use degree  
 ~ understanding: true terms/good intuitions = right concepts ~ beautiful views ~ e.g.: old books, opera  
 ~ statistical physics:  
 1. basic formula of statistical thermodynamics for a s of a canonical ensemble:  $F = -kT \ln Z$  ( $F = -kT/e^{F/kT}$ )  
 ~ 2. evolution equation: order parameter  $\xi$ ; e.g.: non-dim.: Fokker-Planck-eq.: stationary solution: probability  
 density (m density  $\varphi$ ):  $f(\xi) = N e^{-V(\xi)/I}$  [ $f(\xi) = N/e^{V(\xi)/I}$ ]  
 {(1. partition function  $Z = e^{-F/kT}$ ,  $F$  = Helmholtz free energy)  
 ~ [2.  $N$  = normalizing (~ normalization) factor,  $I$  = quantity: intensive (~ intensity ~ quality)]}  
 ~ thermodynamics: equilibrium/non equilibrium  
 ~ 2./1.: statistical theory biological s/synergetics = 2. ~ 1. (stationary: opt. = 1)  
 ~ statistical ensembles: e.g.:  
 statistical physics: info. theory: ensemble: info. theory ~ hypercanonical ~ generalized canonical/non equil.  
 ~ evolution equations: generalized equilibrium/irreversible (non equilibrium) = integro-differential  
 ~  $E_{\text{free}}$  [ $h\nu \sim hR \sim mv^2 (c^2) \sim -kT$ ] = [order/order/disorder (~ decay:  $e^{-x \sim z}$ )]  
 ~ e.g.: statistical physics: applications:  
 I. basic model:  $F$  (free  $E$ ) =  $E - ST$ :  $Z := \sum e^{(\mu N_T - E_T)/kT}/I$ .  $Z := \sum e^{-E_N/kT}$  ~ Riemann  $\zeta$ -fct.:  $\zeta(s)$  ~ special partition fct.  
 ~  $F = -kT \ln Z \sim -kT(I/I)$  ~ order (order/disorder) [ $Z: I/I$  = interaction ~ nonlinear (stationary: opt. = 1):  
 e-function values:  $e^x \approx 2/0,5$  ( $x \approx 0,7$ ) ~ probability: 0,5/0,5 = 1]  
 ~ statistical thermodyn./statistical physics = synergetics (~ statistical: thermodyn. ~ physics):  
 ( $F = -kT \ln Z$ )/( $F = -E \ln Z$ ) = { $V(\xi) = N e^{-V(\xi)/I}$  [ $F$  = molar  $E \cdot N$ : e.g.:  $E \cdot \text{Avogadro}$  ( $U_M \sim E \cdot N_A(L)$ )  $\cdot N \sim F = \mu N$   
 ~  $e^Q$  ( $Q := \text{statistical pot.} : -kT \ln Z$ ) (~ stationary: opt. = 1)]} ~ e.g.:  $1/2 = N \cdot e^{-V(\xi)/I}$  ( $1 \cdot 0,5$ ) ~ well-dosed  
 { $-E$  = negative  $E$  ( $E: h\nu \sim hR$ ) [~ e.g.: negative: mass  $E \sim \text{gravitation } E \sim \text{anti: gravitation} \sim \text{matter} \sim \text{particles}$   
 (e.g.: interaction: photon, Z-boson, meson)]}  
 ~ {probability density = distribution density ~ measure theory: measure density ~ density function (short:  
 density): random variable: discrete (Dirac delta distribution ~ Dirac delta)/continuous (class.)}  
 ~ density: parameter (~ number ~ factor ~ coefficient) [~ coefficient: parameter/number = factor]  
 ~ e.g.: interaction  
 ~ unification: forces ~ interactions: force field/ $E$  = heat (quantity ~  $E$ )  $Q$  ~ physics: Classic/QM = Thermodyn.  
 ~ e.g.: force (interaction) ~  $ma/h\nu \sim mv^2 = kT \sim ST$   
 ~ elemental force: curvature/ $h\nu \sim mc^2 = 1/kT (\beta)$



$[\beta = \text{parameter of statistical physics} \sim \text{heat} (\sim \text{thermal}) \text{ motion} \sim \text{reciprocal temperature parameter}]$   
 $\sim \text{nucleus: fusion/fission} \sim \text{forces: attraction/repulsive}$   
 $\sim \text{e.g.: fission: attraction/repulsive} \sim \text{E: binding } E_B/\text{released } E_B = \text{m-defect} \sim \text{fusion}$   
 $\sim \text{interactions: growth/decay} = \text{approximate (growth} \sim \text{decay)} [\text{stationary: opt.} = 1]$   
 $\sim \text{e.g.: process: cyclic/exponential} = \text{logistic (stationary: opt.} = 1)$   
 $[\sim \text{e.g.: dyn. s: logistic map (function} \sim \text{transformation} \sim \text{eq.} \sim \text{growth): chaos ("order in chaos"):$   
 $\text{deterministic} (\sim \text{dyn.} \sim \text{molecular): Feigenbaum: growth: stable/chaotic} = \text{cyclic}$   
 $(\text{linear discrete logistic difference eq.: discrete dyn. s}) \sim \text{evolution eq.: order parameter}]$   
 $\{\sim \text{values: limited: upper/lower} = \text{threshold: upper/lower} = \text{turning point (stationary: opt.} = 1)\}$   
 $\sim \text{differential eq.: qualitative: growth/decay} = \text{development} (\sim \text{e.g.: limited/exponential} = \text{logistic})$   
 $[\sim \text{development: coefficient} \sim \text{principle of mathematics (analogy principle)}]$   
 $\{\sim \text{development (principle): analogy principle/problems} = \text{heuristic} \approx (\approx) \text{programs (metaphors)/solution} = \sim\}$   
 $\sim \text{I: value(s)} [y/x = z]: \text{process: growth} \cdot \text{decay} = \text{development} \sim \text{growth/decay} = \text{development}$   
 $(\sim e^x \cdot e^{-x} = e^{-z} \sim e^x/e^x = e^{-z}) [\sim \text{e.g.: symm: anti./non} = \Delta (\text{opt.} = \text{neutral})]$   
 $\sim \text{s: decay/growth} = \text{development}$   
 $\sim \text{s/process} = \text{logistic development (stationary: opt.} = 1) [\sim \text{e.g.: steady state}]$   
 $\sim \text{II anti value(s)} [(i)y/x = z]: \text{e.g.: supersymm.}$   
 $\sim \text{I/II} = \text{III: neutral value(s)} [(i)v/u = w]: \text{e.g.:} \sim \text{symm. (opt.} = \text{neutral}) [\sim \text{logic/antilogic} = \sim \text{logic}]$   
 $\sim \text{should/is} = \Delta (\text{opt.} = 0) [\sim \text{e.g.: natural control circuit(s)}]$   
 $\sim \text{structure: formation/decay} = \text{genesis} [\sim \text{development: conservation/fall} = \text{change} (\Delta)] \{\text{stationary: opt.} = 1\}$   
 $\text{e.g.: order/chaos} = \text{chaotic order} \sim \text{ordered chaos} (\sim \text{relation} \sim \text{set} \sim \text{logic}) [\sim \text{structural} (\sim \text{relative, lot, logical})]$   
 $\sim \text{order structure} (= \text{ordered set})/\text{disorder structure} (= \text{disordered set}) = \text{disordered order structure} \sim \text{ordered disorder structure}$   
 $\sim \text{structure/amorphism [amorphous(ness)]} = \Delta \text{ structure (structure} \sim \text{amorph: e.g.: \%: } 20/20 = 60 \sim \text{stationary: opt.: } 50/50 = 1)$   
 $\sim \text{set: structured/structureless} = \text{nonempty} \sim \text{ordered/disordered} = \text{partially-ordered (opt.: well-ordered)}$   
 $\sim \text{ensemble (class): set/proper class} = \text{partial-ordered set}$   
 $\sim \text{transformation: structure/ensemble (class)} = \text{set} \sim \text{invariant/variant} = \Delta \sim \text{e.g.: symm./asymm.} = \text{approx. symm.}$   
 $\sim \text{mathematics: function: pattern/ensemble} = \text{proper class}$   
 $\sim \text{physics/chemistry} = \text{biology} \sim \text{e.g.: phase/chiral} = \text{metamorphosis}$   
 $\sim \text{statistical physics: partition function: growth/decay} = \text{development}$   
 $\sim \text{e.g.: basic model/nonlinear evolution eq.} = \text{approx. (nonlinear motion eq.)} [\sim \text{exact: e.g.: Riemann } \zeta(s)]$   
 $\sim \text{basic formula of the statistical thermodynamics/evolution eq. in the form of a differential eq. s} =$   
 $\text{evolution eq. in the form of a integro-differential eq.} \sim (F = -kT \ln Z)/(\partial/\partial t = Q_j) = (\partial/\partial t = Q_j)$   
 $\sim \text{eq.: evolution: linear/nonlinear} = \text{nonlinear}$   
 $\sim \text{e.g.: Fokker-Planck} \sim \text{Langevin (basic), Master/Fokker-Planck} \sim \text{Langevin} = \text{integro-diff.}$   
 $\sim \text{nonlinear stochastic: Langevin} \sim \text{It\ddot{o}/Fokker-Planck} = \text{integro-diff.} \sim \text{dyn. s: eq.: s/evolution} = \text{nonlinear stochastic}$   
 $\sim \text{It\ddot{o}: stochastic diff. eq. (SDE): ordinary diff. eq. (ODE)/partial diff. eq. (PDE)}$   
 $\sim \text{nonlinear DE: O/P} = \text{S} \sim \text{e.g.: SP: evolution eq.}$   
 $\sim \text{dyn. s: nonlinear stochastic: DE/PDE} = \text{process}$   
 $\sim \text{statistic irrevers. processes: I theory: method: Robertson formalism: e.g.: complex s: coupled dyn. s: evolution eq.}$   
 $\sim \text{dyn. s: coupled/networked} = \text{interconnectivity}$   
 $\sim \text{stochastic: algebra/geometry} = \text{analysis} \sim \text{e.g.: algebraic diff. geometry}$   
 $\sim \text{number theory/manifold} = \text{analytic} \sim \text{e.g.: Riemann } \zeta(s) = \text{special partition function}$   
 $\sim \text{shape} (\sim \text{form})/\text{location} = \text{dyn.}$   
 $\sim \text{e.g.: geometry: algebraic number} \sim \text{algebraic geometry} + \text{algebraic number theory/topology, manifold, knots} = \text{motion} + \text{change}$   
 $\sim \text{development: limited/exponential} = \text{logistic} \sim \text{structuring/destructuring} = \text{restructuring}$   
 $\sim \text{e.g.: exponential process: growth/fall} = \text{approx.}$   
 $\sim \text{growth: positive/negative} = \text{zero} (>0/<0 = 0) \sim \text{stabil/chaotic} = \text{cyclic (Feigenbaum} \sim \text{logistic map)}$   
 $\sim \text{limited/exponential} = \text{logistic (stunted)}$   
 $\sim \text{strict (complete): reversibility/irreversibility} \sim \text{particles number } N: = 1/\rightarrow \infty (\text{thermodynamic limit}) = \Delta$   
 $\sim \text{worlds: world/mirror world} = \Delta (\text{opt.: neutral}):$   
 $\text{e.g.: (artificial/natural} = \text{living})/(\text{natural/artificial} = \text{vitalis}) = \Delta (\text{opt.: neutral})$   
 $\sim \text{cosmos: hole: black/white} \sim \text{culture: sciences/religion} \sim \text{knowledge/believe}$   
 $\sim \text{mathematics: prim numbers: } 1. y/x/iy/x = z/iz \sim 2. v/u/iv/u = w/iw \sim 3. z/z \rightarrow w = z^n \rightarrow w \sim z \rightarrow w^n (\sim 1./2. = 3.)$   
 $\sim 4. \text{one-valued function: } w = f(z) \sim 5. \text{many-valued} (\sim \text{ambiguity}) \text{ function: } w^n = z (\text{e.g.: two-valued: } w^2 = z)$   
 $\sim 6. \text{compact Riemann surface: } w = w(z) [\sim 4./5. = 6.]$   
 $\sim \text{Riemann conjecture: number theory/geometry} = \text{analytic}$   
 $\sim \text{analytic number theory/algebraic geometry} = \text{algebraic number theory} \sim \text{geometric number theory} \sim \text{arithmetic geometry (e.g.: scheme)}$   
 $\sim \text{Riemann surfaces: symm./geometry} = \text{manifolds} \sim \text{group/topology} = \text{analysis}$   
 $\sim \text{e.g.: I/II} = \text{III: I} \sim \text{III} \sim \text{II: e.g.: algebra} \sim \text{analysis} \sim \text{topology} (\sim \text{geometry}): \text{algebraic diff. topology (geometry)} \sim \text{knots}$   
 $\sim \text{prime numbers: Riemann conjecture: set: } >1/2/<1/2 = 1/2 \sim \text{open/closed} = \text{clopen} \sim \text{unit circle: } >1/<1 = 1$   
 $\sim \text{complex number plane} \sim \text{Riemann surface: one-valued/multi-valued} = \text{compact}$   
 $\sim \text{set: ensemble (class): statistic/stochastic} = \text{probability} [\sim \text{e.g.: statistic: partition function (special: Riemann } \zeta\text{-fct.)}]$   
 $\sim \text{cosmos: worlds/anti worlds} = \text{meta worlds}$   
 $\sim \text{dimension: cosmos/non cosmos} = \text{meta cosmos} \sim \text{logic/non logic} = \text{meta logic} \sim \text{measure/non measure} = \text{meta measure}$   
 $\sim \text{interactions:}$

e.g.:

- mathematic physics: vectorial/scalar = tensorial
- coefficient: number (constant)/parameter = factor
- physical/chemical = biological: e.g.: nuclear/molecular = gene-environment
  - ~ strong/weak (Van der Waals forces) = moderate-strong
  - ~ weak/hydrophobe (peptides) = cell-cell ~ EM/cation-pi = gene-protein ~ G/electronic = protein
  - s-e: s/e = s ~ e (opt.: s = e): intern/extern ~ internal/external ~ intrinsic/extrinsic:
- e.g.: truth, beauty, good ~ m, I, E ~ quantity, measure, set ~ spirit, body, soul ~ peace, fairness, justice
  - ~ joy, harmony, love ~ wisdom, compassion, goodness ~ tenderness, empathy, sensibility
  - ~ freedom, solidarity, equality ~ idyllic, dreamlike, romantic
- ~ empathy: cognitive/affective = emotional ~ e.g.: psychopath/choleric = autist
- mundos: intra/inter = interaction (stationary: opt. = 1)
- algebra: commutative/anticommutative = supercommutative
  - ~ e.g.: supercommutative superalgebra: Graßmann algebra
  - mathematics: super/transcendental = meta
- ~ e.g.: numbers: Graßmann/e,  $\pi$ ,  $e^\pi$ , as a rule:  $e^x$ ;  $\alpha$ ,  $\beta$ ,  $\alpha^\beta$  = (hyper) complex, QN
- algebra: commutative/non-commutative = meta commutative
- linguistics (~ semiotics): e.g.: mathematics/non mathematics = ~ (opt.: neutral)
- measure: dimension/dimensionless = meta dimension (~ t ~ space ~ quantity) ~ e.g.: singularity
- set:  $\infty$ /empty (0)  $\emptyset$  = nonempty ~ e.g.: super/transcendent = meta
- general: meta/trans = metatrans ~ transmeta [stationary: opt. = 1 (~ neutral)]
- ~ sphere: hypersuper/metatrans = hypermeta ~ supertrans ~ e.g.: term: quantities/qualities = dimensionless
  - ~ e.g.: values (~ special: symm.)
  - ~ analysis/synthesis = analytic synthesis ~ synthetic analysis
- ~ méta/hyper = xýn (~ metá/super = sýn) ~ e.g.: materialisation/immaterialisation = neutralisation
- ~ meta/trans = meta ~ trans ~ e.g.: metabolism/transcendence = metaphor ~ transmutation (~ evolution)
  - ~ I: metainfo./transinfo. (~ synentropy) ~ meta I/trans I = mutual I (generalized: interaction I)
  - ~ E ~ force ~ momentum (~ impulse): symm./asymm. = Q (quantum) ~ e.g.: transformation
  - ~ Q: m/E = I ~ e.g.: h
  - ~ medium: transformation: quantity/quality = hybrid
  - ~ e.g.: gradient: E/I = heat ~ force/impulse = action ~ reaction = action ~ projection
  - ~ interaction gradient: intra/multi = inter ~ meta/trans = interconnectivity (~ synergetic)
- ~ e.g.: I ~ E ~ F ~ p ~ Q ~ C ~ m ~ h ~ Q (quant) ~  $\gamma$  (photon) ~  $\alpha$  ~ length ~ t ~ temp. ~ pressure ~ density
  - ~ amount of substance (mole) ~ k ~ quantity ~ quality ~ structure ~ relation ~ set
  - ~ medium: meta/trans = interconnectivity ~ e.g.: mutual information [~ transinformation (~ synentropy)]
  - meta<sup>V</sup> ~ trans<sup>V</sup>: culture/nature = life
  - ~ development:
  - arise ~ pass: arise/pass =  $\Delta$  [stationary: opt. = 1 (neutral)]
  - e.g.: differential eq.: qualitative: life: arise/pass = development
    - ~ meta/trans = interaction ~ e.g.: I
    - ~ s/e = develop (opt.: well) ~ e.g.: genesis (opt.: well-syn)
  - ~ trans: formation/information = mutation ~ selection/variation = develop
    - ~ behaviour: term: short/long = middle
- ~ e.g.: brain: reward: culture/nature = vital. (~ monkeys: banana:  $1/n > 6 = 6$ ) ~ just in: time/nature = life
  - ~ homo: money: hunter + gatherers/farmer = nomad
  - disease: having: culture/nature = life ~ s: closed:  $\uparrow S/\uparrow S = \uparrow S$
  - health: being: s: open/open = partial open ~  $\downarrow S/\downarrow S = \uparrow S$
  - ~ merchants + traders/small- + medium-sized entrepreneurs = services + big business and multis
    - disease: acute/chronic = acute chronic
    - ~ e.g.: passion: culture/nature = life ~ therapy: be moderate ~ healing: life-promoting well-being (behaviour)
  - ~ healing: spirit/soul = body ~ psycho/psýchê = physio ~ part/integral = synergistic ~ e.g.: psychosomatic
    - ~ healing/disease = regeneration ~ e.g.: t: convalescent/incubation = relaxation
  - ~ medicine: palliative/preventive = curative ~ allopathy/complementary (~ alternative) = integrative
    - ~ preventive: selective/universal = indicated
    - e.g.: strange/self = synergistic
- ~ scaling: problems: disciplinary/multidisciplinary = interdisciplinary ~ e.g.: economy/medicine = economic medicine
  - ~ solutions: invariant/variant = partial invariant (~ e.g.: covariance) [~ e.g.: universal scaling]
    - {~ dimensionless quantities: e.g.: order parameter, partition function}
  - ~ nonlinear processes (interaction): dim.: space/t = quantity ~ e.g.: mathematics: image/inverse image = mapping
    - ~ representation: internal/external = approx. ~ image/image = mapping
    - ~ projection: inner/outer = iterative ~ model/real = approx.
    - ~ world: mirror/real ~ reflect/empirically = function ~ projection/image = representation ~ reflection/image = mapping
  - ~ quality degree: intensification/deceleration = limiting on the essential ~ e.g.: culture limiting values/nature rhythm = life need

~ nature: pneūma/psūchē (~ Atman) = physio ~ ātman/Atman = Anatmanvada (Buddh.)  
     ~ s/e = s-e ~ e-s ~ e.g.: mathematics/universe = life  
 ~ language: formal/modelling = symbol ~ e.g.: mathematics/physics = chemistry  
     ~ models: conceptual/physical = heuristic  
 ~ s: structures: closed/open = partial open respectively closed [~ opt.: well-develop open]  
 attraction/repulsion = partial attractive ~ repulsive [opt.: well-develop: temporary (~ partial) neutral ~ well-interconnectivity]  
 membranes ~ filters: closed/open = partial permeable (opt.: well-permeable)  
 well: culture/nature = life (opt.: syn) ~ spirit/soul = body (opt.: interconnectivity) ~ meta/trans = interaction  
 ~ duality/unity = polarity (opt.: well-neutral) ~ settings and motive/values = behaviour  
     ~ measure: syndevelopment: e.g.: economic/ecologic = social/physio = psyche  
     ~ individual-collective/collective-individual = individual ~ collective  
 ~ mathematics: rule of: 2/1 = 3 ~ e.g.: clamp fastener ~ partial open loop  
     ~ rule of three: e.g.: spirit: individual/collective = meta  
     ~ soul: specific/general = trans ~ body: subjective/objective = syn  
 ~ culture/nature = life ~ e.g.: life: meaning/mind = sense ~ primates: homo/monkeys = half-monkeys  
     ~ genesis (~ phýein ~ phýesthai):  
     evolution: selection/variation = mutation (opt.: well-neutral)  
     values: culture/nature = life (opt.: well-genesis)  
     ~ e.g.: any (~ arbitrary)/universal = syn  
 ~ value-added (~ quality growth: e.g.: art market: quality/sustainable = fair)  
     ~ true value: accuracy and precision/reality = interaction  
     ~ trimurti: Vishnu/Shiva = Brahma  
 ~ maintainer or preserver/destroyer or transformer = creator  
     ~ Gunas: Sattva/Tamas = Rajas  
 ~ Shiva: general: conservation/destroying = creating and new beginnings  
     ~ knowledge/enlightenment = salvation  
 ~ Gemüt: geistig/seelisch = Gefühl ~ spirit/mind = feeling ~ fantasy/reality = association  
     ~ enlightenment: sapere aude/incipe = Dimidium facti, qui coepit, habet  
     ~ eternal: Elysion/Tartaros = Adina (Adana) ~ Eden  
 ~ Plato: Gemütsanlagen: basic motivations: Nous/Psyche = Thymos ~ Eros/covet = Thymos  
 ~ Psyche: in the strict sense/in a broader sense = traditional (psychosomatic)  
 ~ Freud: motive ~ structures: ego/super-ego = id (needs, gear and affects)  
     ~ chance/destiny = partial chance ~ culture/nature = life  
     society: problems: culture: power/classes = ideological  
     (~ solution: culture/nature = life ~ e.g.: fair/balance = synergy)  
     ~ ideology (fundamentalist)/opportunist = pragmatism  
     (~ solution: principle/plurality = critical values principles)  
     ~ culture: s: political: form of government: e.g.:  
     Plato: decay forms of aristocracy: timocracy/democracy ~ tyrannis/oligarchy  
 ~ democracy: presidential/representative = demarchy ~ direct/indirect = mixed  
 ~ buerocracy/technocracy = juristocracy ~ conflict/consensus = corporative  
     ~ aristocracy/basic = participative (opt.: fair)  
     ~ intelligence: individual/collective = group ~ e.g.: swarm  
 ~ trust: honesty/benevolence = fairness ~ authenticity/credibility (~ competence) = reliability  
     ~ self/foreign = ur ~ e.g.: Geborgenheit  
     ~ believe: progress/regressive ~ science/destiny ~ rational/non rational = critic  
 ~ Gemüt: wise/deep = sensitive ~ bright/quiet = friendly ~ sunny/childlike = sensible (opt.: synwell Gemüt)  
 ~ sublime/seeliges = empathic ~ confirmation/affinity = resonance ~ quiet/movement = quiet movement  
     ~ geronnene: insight/innere Reife = compassion ~ knowledge/wisdom = empathy  
     ~ healthy/ill = partial healthy ~ e.g.: projection  
 [~ e.g.: Reich/Freud = Jung (~ basic impulse: autoregulation/death drive = archetype ~ e.g.: compassion ~ kindness ~ wisdom)]  
     ~ growth/decay = development  
 ~ development: true well/real syn = real true synwell ~ e.g.: gemütliches (gemütvolles) living entity  
     ~ genius: genie/creator = usia ~ perfect/imperfect = partial magnificent (~ excellent)  
     ~ e.g.: spirit: genial/small = mediocre ~ gods and ghosts/human = healer and shamans  
     ~ nature: external/internal = ambiguity ~ e.g.: Gemüt ~ projection  
 (~ being/becoming = creature ~ e.g.: ontology/phenomenology = ousia ~ nominalism/metaphysics = essential)  
 ~ Gemüt: basic: moods/motivations = emotions (~ Gefühl) [~ Gemütsart: temperament]  
     {~ personality types ~ fears ~ temperaments}  
 ~ e.g.: impulse: internal/external ~ s/e ~ genetic/epigenetic (~ impulse control: +/-non = ambiguity)  
     ~ meaning/synwell Gemüt = happiness  
 ~ EQ: (hyper) gifted: sensitive/motivated (intrinsic/extrinsic) = sensible ~ activity  
     ~ IQ: basic: attitudes/values = mentality (~ reason/insight = knowledge)  
     ~ MQ: basic: imagination/intuition = creativity

~ Psyche: IQ/MQ = EQ ~ spirit/mind = body ~ culture: psyche/social = physio (~ CQ: PQ/SQ = BQ)  
 ~ ousia (usia, usie): culture/nature = life (OQ: CQ/NQ = LQ) ~ e.g.: essentia ~ quidditas  
 ~ logic: +/non = ambivalent (~ indifferent) ~ e.g.: syllogism/non syllogism = heuristic  
 ~ behaviour: certainty/uncertainty = partial certainty ~ Geborgenheit/forlornness ~ trust/mistrust = partial trust  
 ~ education: intelligence/gift = personality ~ e.g.: support skills ~ creativity  
 ~ live/vitae = vital ~ e.g.: culture/nature = life  
 ~ evolution: genetic/epigenetic = organism  
 ~ genesis: degeneration/regeneration = generation (stationary: opt. = synwell generation) ~ Vergehen/Werden = Entstehen  
 ~ species: hominid: S/-S = partial -S ~ e.g.: cool/uncool = warm (opt.: moderate warm)  
 ~ deal/non deal ~ plot/non plot ~ illusion/disillusion ~ progress/regressive  
 ~ extrovert/introvert = balance ~ problem: lost in: world/self = lonely  
 ~ diverting/boredom = meanwhile ("Eile mit Weile") ~ Wanderlust/Nahweh = partial Fernweh  
 ~ culture/nature = life: (state effectivity/market efficiency = social productivity)/sustainability = sufficiency  
 ~ liberty/necessity = partial free ~ power: illusions/interests/true/real = labile  
 ~ organised: irresponsibility (~crime)/responsibility = partial responsibility (opt.: moderate responsibility)  
 ~ incompetence/competence = partial competence (opt.: moderate competence)  
 ~ happiness: constraint/Zufall = fragile (~ e.g.: knight/thing = addiction) ~ freedoms: urge/profit = pressure  
 ~ t: simultaneity/asynchronicity = partial simultan (opt.: synchronization)  
 ~ e.g.: order/disorder = partial order (opt. moderate order)  
 ~ t: short-term/long-term = medium ~ space: short-sighted/farsighted = prudently ~ e.g.: values: ideal/real = suitable  
 ~ s: ökonomisches Krankheits/soziales Gesundheits = faires Lebens  
 [("Heilen manchmal/Trösten immer = Lindern oft")/(Heilen möglichst/Trösten empathisch = Lindern wirklich) =  
 (Heilen grundlegend/Helfen vorbeugend = Regenerieren angemessen)]  
 ~ sciences: problem: Geistes/nature ~ e.g.: incomprehensible results: words, concepts, terme/Datenflut, Zahlensalat, calculation  
 ~ solution: understanding between sciences: Geistes/nature = analogy ~ e.g.: disciplinary: inter/trans = multi  
 ~ culture: problems: modern/tradition ~ from 19. century/< 19. century ~ ideologies/ambiguity = ideological ambiguity  
 ~ e.g.: religion: islam ~ monotheistic ~ politics: ideologic/liberal = liberal ~ ideologic  
 ~ market/democracy = market-based democracy ~ democracy-based market ~ solution: synthesis/analysis = heuristic  
 ~ culture: symm./asymm./asymm./symm. = partial symm. ~ e.g.: freedom/equality = solidarity  
 ~ optimistic/critic optimistic/critic pessimistic/pessimistic = critic constructive pessimistic ~ optimistic (opt.: neutral)  
 [~ nature ~ life ~ + · + / - · + / + · - / - · - = - · + ~ + · - ~ thermodynamics law:  $2./\Delta 2./\Delta_{new} 2./2. = enlarged \Delta_{new} 2. (opt.: stationary)$ ]  
 ~ symm. (ex post/ex ante)/asymm. (ex post/ex ante) = partial symm. (ex post/ex ante)  
 ~ eco: qualitative: growth/decay = development (opt.: synwell)  
 ~ ontology: haecceitas/quidditas = entity  
 meaning (~ sense) of life: culture/nature = life ~ problems: egocentric/lost in space = opportunistic self  
 ~ solutions: help ~ redemption: from up/from down = through existence ~ t: future/past = present (topologic)  
 ~ behaviour: cosmos: 5%/95% = 100% ~ culture/nature = life  
 ~ e.g.: be: conscious/unconscious = subconsciously ~ sciences: visible matter/invisible matter + E = m-E  
 ~ life: matter/immaterial = transmaterial ~ ratio/non-ratio = emotion  
 ~ electromagnetic spectrum ~ radiation: visible light/gamma = microwave ~ e.g.: life: growth/decay = development  
 ~ EM: E: +/− = 0 (~ e.g.: electric current) ~ M: pole: north/south = earth (~ e.g.: rotation)  
 knots/strings = loops ~ e.g.: loops: closed (knotted: superstring)/open strings = partial open  
 ~ mathematics: classification problem: knots/intricacies = braid  
 ~ special/general = specific basis  
 ~ sphere:  $S^1 (\sim \mathbb{R}^2)/S^{n>3} (\sim \mathbb{R}^{n>4}) = S^3 (\sim \mathbb{R}^4)$  ~ e.g.: manifolds  
 ~ set theory: intersection/union = difference ~ algebra/topology = analysis ~ algebraic diff. topology  
 ~ universal structure: relationship: mapping/operation = relation ~ set: structured/non structured (amorphous)  
 [~ relationship between elements/non relationship between elements = symmetric difference (opt.: empty difference)  
 e.g.: fuzzy ~ empty { } (zero  $\emptyset$ )]  
 ~ e.g.: compactification ~ possibility: real/pot. = complementary ~ mathematics: invention/discovery = probability  
 ~ Q physics: momentum/position = uncertainty principle  
 ~ perception: reality (real/pot.)/possibility (real/pot.) = fuzzy  
 ~ e.g.: psyche (conscious/unconscious)/nature (real/pot.) = approx. ~ s/e = s-e  
 ~ psyche/physio = impulse ~ e.g.: conscious: ideal/real = dream  
 ~ subconscious: imagination/idea = dream (opt.: inspiration) ~ unconscious: utopy/fantasy = dream  
 ~ life: reaction/action = interaction ~ e.g.: -h/h = exchange interaction  
 ~ symm./asymm. = interconnectivity ~ invariant/variant = synergetic  
 ~ order from order/order from disorder = partial order (~ stationary: opt. = half fragile)  
 ~ genesis: formation/info. = synfo. ~ syntropy/synentropy = partial syntropy  
 ~ e.g.: exergy (~ negentropy)/transinfo. = synergy ~ free: E/entropy = enthalpy (F/S = G)  
 ~ complexity: structures ~ pattern: formation/development = coordination  
 ~ e.g.: degrees of: freedom/bond ~ quantity: symm./asymm./quality: symm./asymm.  
 ~ quantity/quality/quantity/quality  
 ~ decrease/increase/increase/decrease ~ invariant/variant/invariant/variant

~ [degrees of freedom: number of (invariant/variant)/quality of (invariant/variant)]/  
 [degrees of bond: number of (invariant/variant)/quality of (invariant/variant)]  
 ~ degrees of freedom: number of invariant/quality of variant/degrees of bond: number of invariant/quality of variant  
 ~ order/disorder = steady state ~ positive/negative = partial neutral (opt.: neutral) [e.g.: affection]  
 ~ thermodynamics: non equilibrium: new  $\Delta$  (enlarged) law for partial open s: increasing exergy (quality of E in s)  
 ~ e.g.:  $++/- -- = ++$  ~ the good of the good/the bad of the bad = more good  
 ~ negentropy · negentropy/entropy · entropy = syntropy  
 ~ synergy/dysergy = xýnergy  
 principles: culture/nature = life ~ e.g.: development: wellsyn/synwell = wellsyn ~ synwell  
 ~ structures: states/processes = stationary ~ e.g.: development: e-s/s-e = e-s ~ s-e  
 evolution eq.: Schrödinger eq./Hamilton's eq. = Hamilton's principle of stationary action  
 ~ e.g.: reversible/irreversible = stationary  
 ~  $\{[E(\xi) = \xi/H(\xi) = \xi] = [E(\xi) = H(\xi) = 1/2]\}$  ~  $\{[E(\Psi) = \Psi/H(\Psi) = \Psi] = [E(\Psi) = H(\Psi) = \text{opt.}]\}$   
 ~ eq.: Maxwell/Hamilton = Schrödinger: reversible ~ stochastic irreversible ~ stationary:  
 reversible/irreversible = stationary ~ e.g.: field theory/statistical physics = thermodynamics  
 ~ s: equilibrium: static/dyn. = partial dyn. (opt.: stationary)  
 (~ e.g.:  $E_{\text{pot}}/E_{\text{kin}} = E_{\text{tot}}$  ~ Emin/steady state = stationary ~ state/process ~ rest/motion)  
 ~ process: revers./irrevers. = stationary ~ state: static/dyn. = stationary  
 ~ non-equilibrium: ensemble/irrevers. = partial irrevers. (opt.: stationary)  
 ~ equilibrium/non-equilibrium = partial equilibrium (opt.: stationary)  
 ~ symm./asymm. = partial symm. (opt.: stationary)  
 (~ e.g.: relaxing/tense ~ passivity/activity)  
 ~ e.g.: partition function, order parameter, thermodynamics, statistical physics  
 ~ thermodynamics law:  $2./\Delta 2./(\Delta)2./\Delta 2. = \text{new}\Delta 2.$  (opt.: enlarged new $\Delta 2.$ )  
 [~ equilibrium: +/non/non/+ = partial (~ symm./asymm./ (a)symm./asymm. = partial symm.)]  
 ~ I: probability:  $\rightarrow 1/\rightarrow < 1 \approx 1/2$  ~ classical physics/statistical physics ~ QM = thermodynamics  
 ~ rest/motion = stationary ~ goal/way = medium  
 ~ models/experiments ~ observation = simulation ~ theory/empiric = heuristic ~ prognosis/projection = modelling  
 ~ sign: in the strict sense/in a broader sense = hint  
 ~ e.g.: abstract/concrete = synonymous ~ meta/trans = ~ (~ hyper/super = ~)  
 ~ letter/number = language ~ term/picture = symbol (~ metaphor) ~ anschauliche Begriffe/abstrakte Bilder = ~  
 [~ Q: matter/space and t = I ~ formation/content = usia  
 ~ matter/space = t (~ order ~ order principle ~ construct) ~ universe/cosmos = kósmos ~ unlimited/ $\infty$  = partial  $\infty$   
 ~ values: terms/sphere = relationships (stationary: opt.: harmonic interactions) [~ e.g.: non dimensional]  
 {~ mathematics: structures/sets = relationships (~ e.g.: interaction [~ stationary: opt.: neutral (~ harmonic)]  
 ~ well being support: well life (nature)}  
 ~ behaviour: addiction/non addiction (~ withdrawal) = moderate (stationary: opt. abstinence) ~ e.g.: culture/nature = life  
 ~ terms/views = begriffliche Anschauungen ~ anschauliche Begriffe ~ e.g.: Hieroglyphs (Maya: Emblem glyph) [opt.: symbol]  
 {algebra/set = language (~ e.g.: culture: Occident/East = Orient) [~ (v/u = w)/(iy/x = z) = (probability: 1/0 = <1 >0) ~ dimensionless]  
 e.g.: coordinate system ~ Maya: codices ~ calendar ~ s-e interaction: words/picture = sign}

↓ ~

partial [partially, half (semi)] open systems:

E →	exchange interactions	→ E
particles →	interactions	→ particles
(neg)entropy →	(neg)entropy production	→ (neg)entropy
±I →	±(Δ)I	→ ±I

E, matter, S balance for a stationary open system with chemical reactions

(linear stationary processes: principle of minimum entropy production by Prigogine)

[partial open system: e.g.: molecules, filters, membranes ~ skin ~ bone ~ tissue ~ organs ~ organism ~ brain: bloody barrier ~ memory]

↓ ~

I principle: Local relative: max/min = stationary (opt. = 1):

Quantity/Qual. = Güte: ./equil. ./lin. ±station. dyn. Feedback

(~ stationary: opt.:  $\uparrow(\Delta)$  Güte of the balance flows: Prod. (Δ):  $S < 0 \sim I >> 0 \sim O >> 0 \Rightarrow \uparrow S < 0 \sim I > 0 \sim O > 0$ ):

Free E principle of I: Prod. (Δ):  $I >> 0/S < 0 = \text{Order } O >> 0$

~ Negentropy principle of order: Prod. (Δ):  $\uparrow: S < 0 \sim I > 0 \sim E_{\text{pot}}$  Principle of glocal rest pot. (stationary: opt.: generic pot. well)

<u>weak extr. (glocal relative): (Δ) qual. &gt; quant.:</u>	<u>dto.:</u>	<u>weak extr. (dto.): (Δ) qual. &gt;&gt; quant.:</u>
↓E (→ min. E) →	exchange interactions	→ ↓E (→ min. E)

↓radiation →	interactions	→ ↓radiation
↓free E ( $\sim -kT$ ) [ $\rightarrow$ min. F] → ↓I ( $\rightarrow$ min. I) → ↓matter ( $\rightarrow$ min. matter) → ↑immatter ( $\rightarrow$ max. immatter) → (immatter > matter) → ↓order ( $\rightarrow$ min. order) → ↑disorder ( $\rightarrow$ max. disorder) → (order > disorder) → -S > S: ↓-S ( $\rightarrow$ min. -S) → ↑S ( $\rightarrow$ max. S) →	( $\Delta$ )↓ entropy production P (P = Min.) [~ local max I ( $\Delta$ I)] {local max. Qual.} ~ -P>P (~ stationary: opt.: I/P>>0 (~ F <sub>w</sub> /S <sub>w</sub> >>0) [~ -P>>P] ~ P ≤ 0 ~ P = Min. $\Rightarrow$ ( $\Delta$ )I>0/( $\Delta$ )S<0 (P = Min.)/(dxP ≤ 0) = (P ≤ 0 ~ P = Min.) ~ ↓(Δ)-H = extr. ~ ↑(Δ)-S/↓(Δ)-k $\Rightarrow$ -H = extr. ~ S = -kΣp <sub>j</sub> Inp <sub>j</sub> ~ S = -kΣw <sub>j</sub> Inw <sub>j</sub> $\Rightarrow$ ~ -H→relative min. = -S→rel.max./ -k→rel.min. = extr. (min.) [stat. (in the rule)]: opt.: -Hdt = stat. ~ Synergy	→ ↑free E ( $\rightarrow$ max. F) → ↑I ( $\rightarrow$ max. I) → ↓matter ( $\rightarrow$ min. dto.) → ↑immat. ( $\rightarrow$ max. dto.) → (immatter >> matter) → ↑order ( $\rightarrow$ max. dto.) → ↓disorder ( $\rightarrow$ min. dto.) → (order >> disorder) → -S >> S: ↑-S ( $\rightarrow$ max. -S) → ↓S ( $\rightarrow$ min. S)

↓ ~

$\Delta 2.HS = \Delta Max.$  global S  $\Rightarrow$  ~ Local/Global = L-G (Glocal): spirit/mind = do (stationary: opt.: universal ewig all-best well behavior)  
Prod.(Δ): ↑: Internal E  $U>>0$ /Epot  $V<<0$  = sufficient  $E>>0$  = -∫Fdx = stationär  $\Rightarrow$  ~ -∫pdv = stationär ( $E_{well}$ ) [~ F<sub>well</sub> ~ O<sub>well</sub> ~ I<sub>well</sub>]  
~ Principle of stationary interaction  $H_w$  (WW<sub>E</sub>) ~ interaction-functional  $dW^2 = 0$  (~ Hamilton Principle)  $\Rightarrow$  ~ WW<sub>well</sub> ( $H_{well}$ )  
 $\Rightarrow$  ~ Hamilton fct. H  $\Rightarrow$  nonlin.Hamilton fct.  $H_w$  = stationary ( $H_{well}$ ) ~ Boltzmann Fct(al)[Theorem]  $\mathcal{H} \sim S = -k \mathcal{H} \sim F = E - ST$   
(~ H - kT $\mathcal{H}$ ) ~ F = -kT $\mathcal{H}$  (~ H<sub>w</sub> $\mathcal{H}$ ) ~ F = -kTlnZ (~ H<sub>w</sub> $\mathcal{H}$ ) ~ Ω = -kTlnZ ~ S = -kΣw<sub>j</sub>Inw<sub>j</sub> (entropy = I)  $\Rightarrow$  ~ S = dto.  $\mathcal{H}$   
 $\Rightarrow$  ~ (Δ)↓ Boltzmann H-Theorem: Entropy production density (term)  $\sigma_s(r,t) := -k \int J\{f\} \ln f d^3v \geq 0 \sim dH: dH/dt \geq 0$   
~ entropy density  $S(r, t) = q_s := -kq\eta$   
~ Boltzmann: Principle ~ H-Fct.:  $\eta$  (~  $q_\eta$ ) [~ entropy: measure for deficit of I ~ measure for disorder ~ measure for unknowledge]  
~ Hamilton Principle:  $W[\Gamma] = \int L dt = \text{extr.} \sim dS/dq(t) = 0$  ~ Hamilton:  $dW(t)/dH(t) = W^2$  ~ Boltzmann:  $dH(t)/d\mathcal{H}(t) = \mathcal{H}_{ex}$  = stationary  
[~ H-Fct. (Theorem) because of greek H (~  $\eta$ ) should be remember real on entropy for entropy production density] ~  $dH(t)/dF_x = H_w$   
~  $dE_x(t)/dV_x(t) = H_{ex}$   
~  $dy/\delta \int (./I-D) = \Phi$  (dto.):  $V_x/E_x = \Phi$  ( $\mathcal{H}_{ex}$ , dto.) ~ S = -k $\mathcal{H}$  ( $\mathcal{H}$  ~ Lyapunov fct.) ~ S = klnW ~ F = -kTlnZ ~ H = S/k  
 $\Rightarrow$  ~ -H = Σp<sub>j</sub>Inp<sub>j</sub> = extr. ~ exchange interaction  $H_{ex}$  = exchange  $E_x$  = stationary ( $\mathcal{H}_{ex}$ well)  $\Rightarrow$  nonlin. Eq.: well: dyn.: I-D:  
 $\Rightarrow$  (exchange: E  $E_x$ well = stationary,  $V_x$ well):  $dW^2$ well/dx(t) =  $\Phi$  ( $H_{well}$ , log. growth,  $H_w$ ,  $H_{well}$ ,  $H_{ex}$ well,  $\int dt$ ) =  $\mathcal{H}$ well {Φ} ~ dto. = stationary  
~ Differential/Integral = I-D ~  $dy/\int \dots = d\dots, \int \dots$  ~ e.g.: dH/Hamilton Principle =  $\Phi$  (d...,  $\int \dots$ ) ~  $\delta \int dt L = 0$   
~ Hamilton Principle for fields:  $\delta \int L dt/dx \sim dS/dx = I-D \sim dS/dq(t) = \Phi$  (S, q, t,  $\int \dots$ ) =  $W[\Gamma] \Rightarrow D = \Phi$  (D, I) =  $\mathcal{H}\{\Phi\}$   
~ efficiency: min input  $\rightarrow$  max I/min entropy production = stationary (opt. = 1)  $\rightarrow$  effectivity (exergetic utilization rate)  
(~ max efficiency: min input  $\rightarrow$  opt. I (ΔI)  $\rightarrow$  opt. effectivity)

↓ ~

cybernetics: natural dyn. nonlin. feedback control circuit:

e:

(neg)entropy → ±I →	controller (neg)entropy production ±(Δ)I	→ (neg)entropy → ±I
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⇕

<u>weak extr. (glocal relative): (Δ) qual. &gt; quant.:</u>	controlled system <u>dto.:</u>	<u>weak extr. (dto.): (Δ) qual. &gt;&gt; quant.:</u>
↓E ( $\rightarrow$ min. E) →	exchange interactions	→ ↓E ( $\rightarrow$ min. E)
↓radiation →	interactions	→ ↓radiation
↓free E ( $\sim -kT$ ) [ $\rightarrow$ min. F] → ↓I ( $\rightarrow$ min. I) → ↓matter ( $\rightarrow$ min. matter) → ↑immatter ( $\rightarrow$ max. immatter) → (immatter > matter) ↓order ( $\rightarrow$ min. order) → ↑disorder ( $\rightarrow$ max. disorder) → (order > disorder) -S > S: ↓-S ( $\rightarrow$ min. -S) → ↑S ( $\rightarrow$ max. S) →	( $\Delta$ )↓ entropy production P (P = Min.) [~ local max I (ΔI)] {local max. Qual.} ~ -P>P (~ stationary: opt.: I/P>>0 (~ F <sub>w</sub> /S <sub>w</sub> >>0) [~ -P>>P] ~ P ≤ 0 ~ P = Min. $\Rightarrow$ ( $\Delta$ )I>0/(Δ)S<0 (P = Min.)/(dxP ≤ 0) = (P ≤ 0 ~ P = Min.)	→ ↑free E ( $\rightarrow$ max. F) → ↑I ( $\rightarrow$ max. I) → ↓matter ( $\rightarrow$ min. dto.) → ↑immat. ( $\rightarrow$ max. dto.) (immatter >> matter) → ↑order ( $\rightarrow$ max. dto.) → ↓disorder ( $\rightarrow$ min. dto.) (order >> disorder) → -S >> S: ↑-S ( $\rightarrow$ max. -S) → ↓S ( $\rightarrow$ min. S)



s:

<u>weak extr. (glocal relative): (Δ) qual. &gt; quant.:</u>	<u>controlled system</u> <u>dto.:</u>	<u>weak extr. (dto.): (Δ) qual. &gt;&gt; quant.:</u>
↓E (→ min. E) →	exchange interactions	→ ↓E (→ min. E)
↓radiation →	interactions	→ ↓radiation
↓free E (~ -kT) [→ min. F) →	(Δ)↓ entropy production P (P = Min.)	→ ↑free E (→ max. F)
↓I (→ min. I) →	[~ local max I (ΔI)] {local max. Qual.}	→ ↑I (→ max. I)
↓matter (→ min. matter) →	~ -P>P (~ stationary: opt.: I/P>>0	→ ↓matter (→ min. dto.)
↑immatter (→ max. immatter) →	(~ Fw/Sw>>0) [~ -P>>P]	→ ↑immat. (→ max. dto.)
(immatter > matter)	~ P ≤ 0 ~ P = Min. ⇒ (Δ)I>0/(Δ)S<0	(immatter >> matter)
↓order (→ min. order) →	(P = Min.)/(dxP ≤ 0) = (P ≤ 0 ~ P = Min.)	→ ↑order (→ max. dto.)
↑disorder (→ max. disorder) →		→ ↓disorder (→ min. dto.)
(order > disorder)		(order >> disorder)
-S > S: ↓-S (→ min. -S) →		→ -S >> S: ↑-S (→ max. -S)
↑S (→ max. S) →		→ ↓S (→ min. S)



(neg)entropy → ±I →	controller (neg)entropy production ±(Δ)I	→ (neg)entropy → ±I
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I: material/immateral = both

e.g.:

medium

matter/space, time = E (~ m/m, s = hν)

*meaning of life ≈ opt. entropy utilization (~ entropy: avoid/recycle = reduce) = entropic principle*

e.g.:

*general: natural circulation: sustainability: natural resources, livelihoods*

*~ xýnevolution: cooperation/complementary = symbiosis (~ culture/nature = life)*

*~ special: action: m<sup>2</sup>/s: circulation: Γ (~ quantum)*

*thermal diffusivity: a*

*(opt. thermal diffusivity: cooperation with warm up reciprocal for utility together)*

*reaction: m/s: velocity field (Kelvin theorem: conservation of circulation)*

*interaction: 1/ms: circular vibration  $\hat{Z}_1(Z) = \hat{Z}_2(Z)$*

action: m <sup>2</sup> /s →	interaction: 1/m ↔	→ reaction: m/s
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↑ ~ 2.:

action: s →	interaction: 1/ms ↔	→ reaction: 1/m
-------------	------------------------	-----------------

↑ ~

action: ε →	interaction: ε ↔	→ reaction: ε
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e.g.: statistical physics of non equilibrium-system: Boltzmann equation: solution methods: possible parameters:  $\varepsilon$ :  
 $\varepsilon$  = mean free path/characteristic length macroscopic homogeneities/ $\varepsilon$  = relaxation time/macroscopic time something type =  
 $\varepsilon$  = moment higher order of velocity distribution

$\updownarrow \sim$  Principles of life:

General: $E \text{ (J)} \rightarrow$	Generalized: $1/c^2$ $\leftrightarrow$	$\rightarrow$ Special: $m \text{ (kg)}$
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e.g.:

m-E equivalence

$\sim$  I: conversion: physics  $\sim$  mathematics: m-factor-E

$\sim$  universe:  $k/-k = \pm k$  (opt. = 0)

[ $\sim$  e.g.:  $k$ : culture/nature = life  $\sim$  appearance ( $\sim$  cosmetrical)/ $S$  = destructive ( $\sim$  degenerative)]

$\downarrow \sim$

partial [partially, half (semi)] open systems:

I $\rightarrow$	free energy principle of I	$\rightarrow$ I
matter $\rightarrow$	interactions	$\rightarrow$ matter
Free E $\rightarrow$	entropy production	$\rightarrow$ entropy

E, matter, S, I balance for a stationary partial open system by time-independent boundary conditions as well as inputs with physical biochemistry interactions

(nonlinear stationary processes: principle of stationary entropy production by stationary friction)

[partial open system: e.g.: molecules, filters, membranes  $\sim$  skin  $\sim$  bone  $\sim$  tissue  $\sim$  organs  $\sim$  organism  $\sim$  brain: bloody barrier  $\sim$  memory]

$\downarrow \sim$

Life Principle: moderate degree of E, matter, S and I: quantity/quality = Güte [ $\sim$  kindness (stationary: opt. = 1)]

matter $\rightarrow$	interactions	$\rightarrow$ matter
(free) E ( $\sim -kT$ ) $\rightarrow$	stationary $\pm S$ ( $\sim \pm F$ ) [ $\sim \pm I$ ] production: $-S_w$ ( $\sim F_w$ )	$\rightarrow$ entropy
I $\rightarrow$	[ $\sim I_w$ ]	$\rightarrow$ I

$\downarrow \sim$

cybernetics: natural control circuit:

e.g.: biotroph life ( $\sim$  order from disorder) [ $\sim$  chaos from order] { $\sim \downarrow$  chaos from chaos}:

e:

I $\rightarrow$ ( $dI/dt = <0$ )	Controller [ $d_i I$ (kindness)/ $dt = >0$ ]	$\rightarrow$ I ( $d_e/dt = >0$ )
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$\Updownarrow$

E $\rightarrow$ ( $dF/dt = <0$ )	controlled system [ $d_x H$ (enthalpy) $>0$ ]	$\rightarrow$ E ( $dF/dt = >0$ )
matter $\rightarrow$ ( $dE/dt = <0$ )	[ $d_x G$ (free enthalpy) $<0$ ]	$\rightarrow$ matter ( $dE/dt = >0$ )
entropy $\rightarrow$ ( $dS/dt = >0$ )	$d_x P$ ( $\sim d_i S$ ) $<0$ ( $\sim \uparrow$ order)	$\rightarrow$ negentropy ( $d-S/dt = >0$ )
I $\rightarrow$ ( $dI/dt = <0$ )	$d_x I$ (Güte) [ $\sim d_i I$ ] $>0$ ( $\sim \uparrow$ order)	$\rightarrow$ I ( $dI/dt = >0$ )



$\Updownarrow$  e.g.: Kultur/Natur = Leben

~ Trieb: [Abfuhr/Beschränkung = Umwandlung (Steuerung ~ Kontrolle)]/Begrenzung = Transformation (Regelung)

s:

$E \rightarrow$ (dF/dt = <0)	controlled system [d <sub>x</sub> H (enthalpy) >0]	$\rightarrow E$ (dF/dt = >0)
matter $\rightarrow$ (dE/dt = <0)	[d <sub>x</sub> G (free enthalpy) <0]	$\rightarrow$ matter (dE/dt = >0)
free E $\rightarrow$ [d-S/dt = <0 (negentropy)]	d <sub>x</sub> P (~ d <sub>i</sub> S) <0 (~ ↑order)	$\rightarrow$ entropy (dS/dt = >0)
I $\rightarrow$ (dI/dt = <0)	d <sub>x</sub> I (Güte) [~ d <sub>i</sub> I] >0 (~ ↑order)	$\rightarrow$ I (dI/dt = >0)

$\Updownarrow$

I $\rightarrow$ (dI/dt = <0)	Controller [d <sub>i</sub> I (kindness)/dt = >0]	$\rightarrow$ I (d <sub>e</sub> /dt = >0)
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$\Downarrow \sim$

y  
d<sub>e</sub>S ~ 0

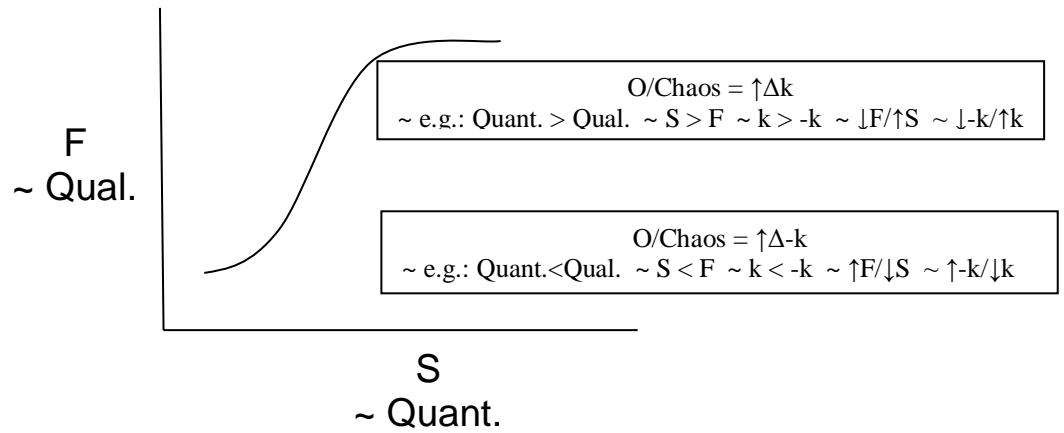
z  
Chaot. O  
entropy balance:  $\Delta S = \Delta_i S + \Delta_e S$   
~  $\int P dt = \text{extr.}$   
~  $dk(T) = 0 \sim \int k(T) dt = \text{extr.}$   
(stationary: opt. = 1)  
e.g.: 3. Reich: Autoritäre Anarchie

d <sub>i</sub> H <sub>U</sub>	d <sub>i</sub> I <sub>U</sub>	d <sub>i</sub> G <sub>U</sub>
d <sub>x</sub> H <sub>SU</sub>	d <sub>x</sub> I <sub>SU</sub> [controlled chaos (stationary: opt. = 1)]	d <sub>x</sub> G <sub>SU</sub>
d <sub>i</sub> H <sub>S</sub>	d <sub>i</sub> I <sub>S</sub>	d <sub>i</sub> G <sub>S</sub>

d<sub>e</sub>U ~ Chaos

x

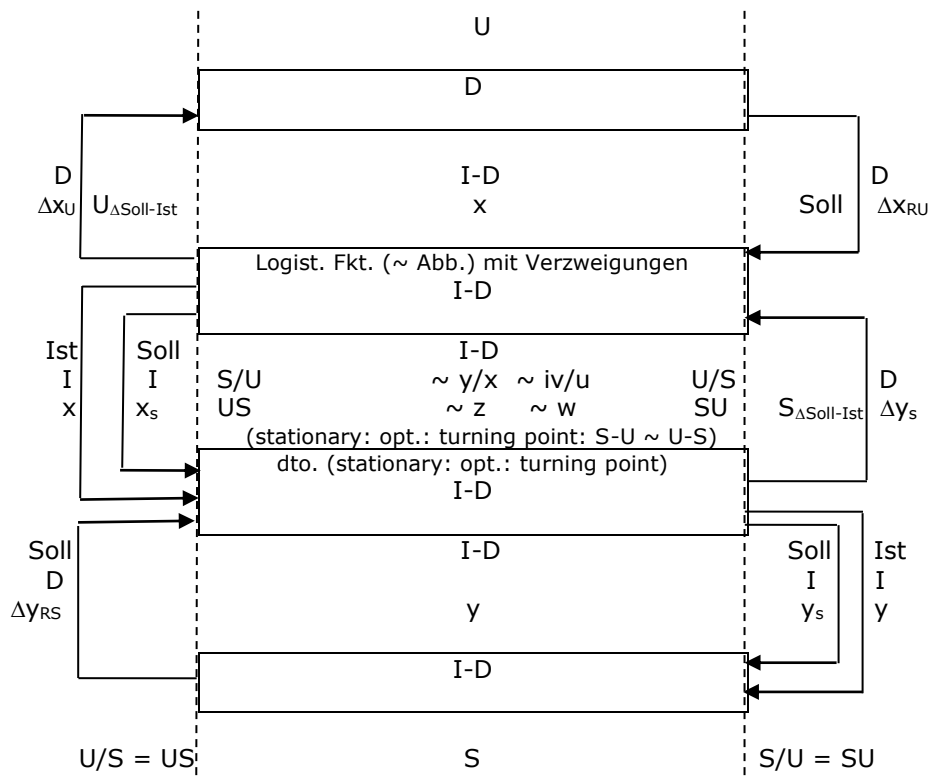
w  
Geordn. Chaos  
 $\Delta S_w = \Delta_i S \cdot \Delta_e S$   
~  $\int S_w dt = \text{extr.}$   
~  $dk_w^x(T) = 0 \sim \int k_w(T) dt = \text{extr.}$   
(stationary: opt. = 1)  
 $k_w = \int \mathcal{H}(t, T)$   
[~<sup>x</sup>: SU ~<sub>w</sub>: Qual. · Quant. = WW-  
Güte (~ kindness)]  
{ (~ -k · -k ~ -k · k ~ -k ~ ↓k · ↑k  
-k/-k ~ -k/k ~ k/-k ~ ↓k/↑k)  
[~ F · F ~ F · S ~ F ~ ↓S · ↑S  
~ F/F (~ F/S ~ S/F) ~ F ~ ↓S/↑S]}  
~ ±k<sub>w</sub>: ET ~ -ET ~ ↑E · ↓T ~ ↑-E · ↑T  
~ E/T ~ -E/T ~ ↑E/↓T ~ ↑-E/↑T  
~ -E · -T ~ E · -T ~ ↑E · ↑-T ~ ↓E · ↓-  
T ~ -E/-T ~ E/-T ~ ↓E/↑-T ~ ↑E/↓-T



Aims: gain-gain/fair-fair = best-best (stationary: opt.: well-well) ~ civil./nature = life  
 ~ e.g.: well/well = synwell ~  $well_x^S \cdot well_x^U = well_x^{SU}$  [stationary: opt.: 1 (~ well<sub>w</sub>)]  
 ~ well-well:  $\uparrow F/\downarrow S = O/Chaos$  ~  $\downarrow S/\uparrow F = \downarrow Chaos/O$  ~  $\uparrow F/F = \uparrow O/O$  ~  $\downarrow S/S = \downarrow Chaos/Chaos$   
 ~ gain-gain: e.g.: Untermieter, Wo.-Leerstand/Mieter, WG, Ggs. Hilfe; Tausch; Teilen; Symbiose; Koop.;  
 ~ F/S: Wasser, Medizin, Essen, Überfluß/Wassermangel, Krankheit, Hunger, Mangel  
 [stationary: opt. (50% ~ 0,5/dto.) = 100% ~ 1 (Grad ~ WS)]

↕ ~

Geregelte ./lin. dyn. gekoppelte Netzwerke  
 e.g.: Knoten ~ Engpaß ~ Krit. Pfad [~ krit. Pkt. ~ Bifurkation (Verzweigung)]



Eq.:  $D/I = I-D \sim D/S = D\text{-Chaos} \sim D/K = S-K$   
 $\sim$  e.g.:  $I-D: (dU/dS)/(dS/dU) = \Phi$  (Gekoppelte (vernetzte) Regelkreise)  $= F[f]$   
 $\sim S-U: dS/dU: \Phi$  [SU-Soll-Ist logist. growth ( $\sim$  map)]  $= F[f]$   
 {stationary: opt.: Ewige universal all-best wohl  $S = U \sim S-U$ : Ist = Soll:  $S/U = S-U \sim$  communis/phýsis = bios}  
 $\sim dy/dx = \Phi$  (Geregelte ./lin. dyn. Netzwerke)  $= F\{f\}$   
 $\sim$  dto. = ./lin. mehrdeut.-mehrwert. Fkt.  $\Phi(w) = \text{Funktional } F[f] \sim$  dto.  $= f_x = F_x$   
 $\sim$  Verzweigungen:  $dw/dz = \Phi(w) = w \sim$  dto.  $= \Phi(F_w) = w = z^k \sim$  dto.:  $F_w = \Phi\{f\}$   
 $\sim$  dto. = ./lin. mehrdeut.-mehrwert. Fkt.  $\Phi_w(\text{dto.}) = F\{f\}$   
 $\sim$  e.g.: Kosmos: Mikro/Makro = Meso: Raum  $\sim t \sim$  (Im)Mat.  $\sim E \sim m \sim Q\text{-Matrix} \sim \text{\AA}ther \sim \text{Superstrings}$

$\Updownarrow \sim$  Matrix  
y

z	D	D	D	w
	D-C	I-D	S-K	
	S	I	K	
x				

## List of symbols- and abbreviations

/	relation
/	complex of relationship
$\sim$	analogy, equivalent, similar, corresponding... (depends on respectively context)
$\Delta$	delta
:	part of
dto.	ditto
$\Omega$	cosmological parameter of density
QFT	quantum field theory
$\Downarrow, \Rightarrow, \Leftarrow, \Leftrightarrow, \Updownarrow$	derivation

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