



Toward a new Information Theory

A systematically relativized approach to conceptualization processes

Method of Relativized Conceptualization – Relativized Systemic

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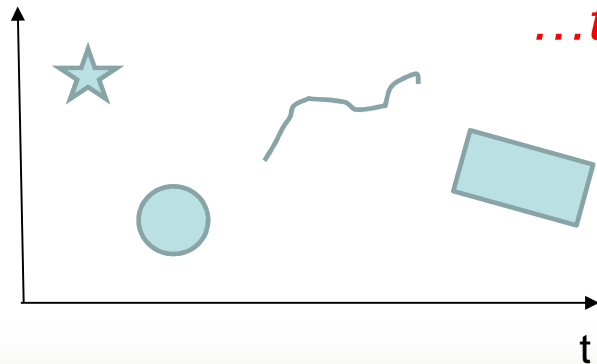


Conceptualization Process

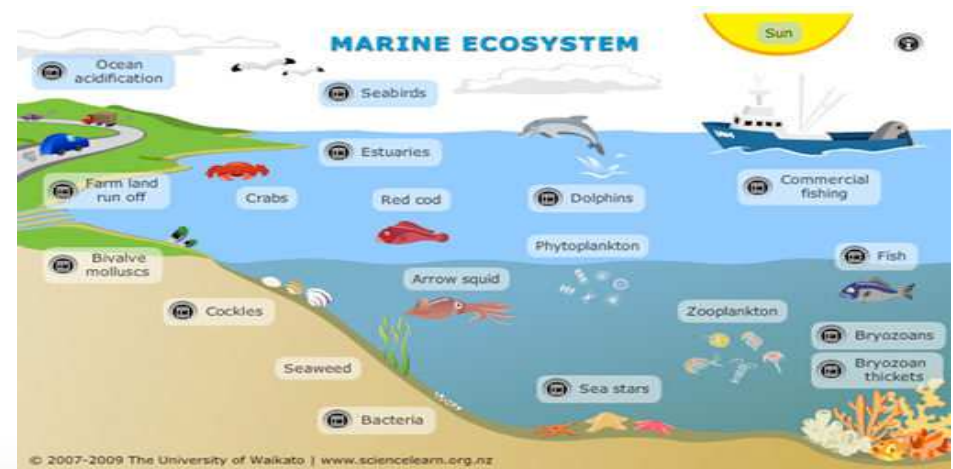
The “Real” comes to us as scattered traces in space and time....

... in which we conceptualize regularities, entities, systems, and eventually “inner” and “outer” causalities as **existing independently of the elementary space-time anchored “facts” that manifest them**

From
“facts”...



...to space – time
independent
models



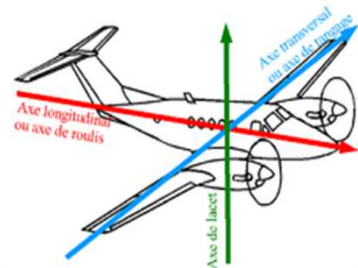


Anticipation Process

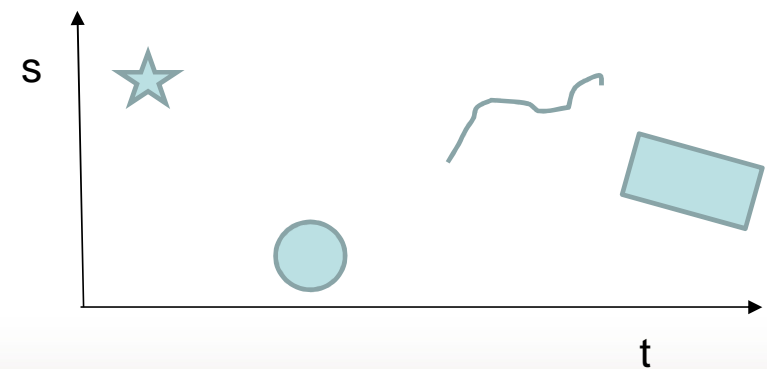
Conversely, we evaluate the adequacy of our hypothesis or of our capacity to innovate...

... relatively to the ***the elementary space-time anchored “facts” that our models make it possible to forecast***

*From concepts
(models)*



*... To
“facts”...*





The stakes

If it is possible to conceive a kind of “*algebra*” to scientifically legitimate the *genesis* of *any model*, out of “*facts*” and, conversely, the forecasts of *facts* out of *models*, then one can hope for

a tremendous impact on all our scientific and innovative industrial processes in terms of efficiency, productivity and profit

... and such is the perspective opened by MRC and formally developed with RS, a unique achievement.



MRC : initial context

Out of a long confrontation with the very specific cognitive situation entailed by quantum physics¹...

...***Pr. Mugur Schächter***² has turned upside down our way of thinking Reality and our place within this Reality

1 : Mioara Mugur-Schächter & Alwyn van der Merwe, *Quantum Mechanics, Mathematics, Cognition and Action*, Kluwer Academic, (2002).

2 : <http://www.mugur-schachter.net>



MRC : genesis

Her research gave rise to a ***constructive Relativized Method of Conceptualization (MRC)***³ of general application, which highlights the way we come to conceptualize « *entities* », as the reproducible substratum of ***motivated descriptions*** which build knowledge about them, ...



IMQ in a nutshell

... As a counterpart has emerged a qualitative *Infra Quantum Mechanics (IQM)*⁴

Any microstate is regarded as a *built concept*, a conceptual mark which conventionally separates the operational **genesis** of a support from its **qualification**, relative to some *qualification grid*.



MRC : back to the origin

This has led to a brand new interpretation of Hilbert-Dirac formalism in Quantum Physics, called **MQ2⁵**, endowed with a meaningful theory of Measure, which brings conceptual clarity in formalism and dissolves false paradoxes.

5 : <https://arxiv.org/abs/1506.00431>



RS

The mathematical-physical paradox

There is a gap between the mathematical Theory of Measure (Lebesgue) which, in particular underlies the Theory of Probability (Kolmogorov)....

... and the way « classical » physics conceives objects as *being* there with unambiguous space-time limits



RS Initial questioning

This gap leads to catch 22 situations and innumerable paradoxes especially when dealing with « complex systems », a still purely qualitative and undefined concept

– Biological systems, Mechatronic systems, Ecosystems,...

Where are the *limits*? *What* do we speak about? According to which *views* do they *exist*?⁶

6 : H. Boulouet, Représentations complexes en ingénierie système, p101 à p129 in Leleu-Merviel, S. Boulkekbache-Mazouz, H. (dir) (2013) Recherche en design, processus de conception, écriture et représentations, iSTE éditions – Londres.



RS motivation

If ***MRC*** related developments are of general application....

... then it must be possible to come up with a conceptual and pragmatic answer on that basis...



RS constructive mechanics

But, to be *operational*, such a generalization must give rise to some very *special algebra, physically meaningful...*

... and *any* consensual way of building knowledge, projects or hypothesis must be representable in that framework



RS physical-conceptual constructs

In particular, the factual-conceptual *genesis* of such classical physical concepts as *physical continuity, state, system,...* must be made explicit...

Stating that some ***statistics*** reveal a ***probability law***, and therefore constitutes some knowledge about “something”, must be unambiguously associated with ***a general pattern of conceptualization of that “something”***, which is qualified by a ***probability law***

As a result, ***entropy*** and ***complexity*** are endowed with a relativized definition and become ***computable and verifiable***

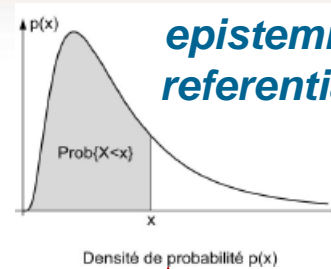
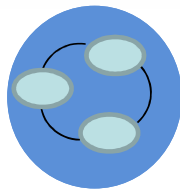
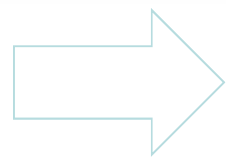
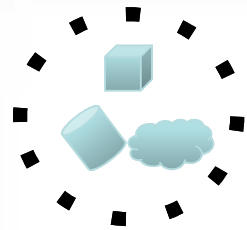


RS view on Probability and Statistics

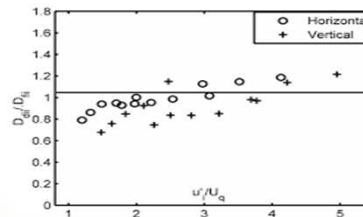
Conceptualization process (human or automated – AI), relative to a finite set of *generation* and *qualification* processes : **the epistemic referential**

Computation of the probability law relative to the **epistemic referential**

Computation of a **confidence interval** to qualify the correspondence between the **expected** and the **realized**



Convergence ?



Factual individual descriptions relative to the **epistemic referential**

An **entity model** (material object, system, ...)

Statistical distribution

Factual descriptions, theoretical hypothesis, forecasts, ...



RS and its applications

Such is the move initiated by *Relativized Systemic*⁷ (H. Boulouet)...

...whose formalism has made possible computerization as a language...

...to be specialized according to application domain...

...so that each application may develop an Integrated Development Environments (IDE) of its own



Methodological architecture

