

Real Logic and Semantic Continuum

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Abstract

The paper contains a sketch of novel logical semantics

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In order to sketch a novel logical semantics let us assume that there is no distinction between logic and ontology, and respectively between theory and metatheory, therefore logic is examined as a resource of conceptual description of the whole real Universe. Further, let us introduce a basic notion of *semantic continuum* (for details see Preface to [1]). Its informal meaning is that it contains meanings of all words. Formally, semantic continuum is defined as follows: let \mathfrak{A} be a semantic structure (a class of meanings with all relations between them), then the non-Archimedean extension of \mathfrak{A} is called semantic continuum of \mathfrak{A} and it is denoted by $^*\mathfrak{A}$. For instance, suppose \mathfrak{A} is a Boolean algebra, then $^*\mathfrak{A}$ is a semantic continuum of Boolean algebra. The new algebra $^*\mathfrak{A}$ preserves all basic properties (distributivity, commutativity, associativity, etc.) of Boolean algebra. The main difference is that any member of semantic continuum, which is distinct from Boolean members, is

greater than the Boolean unit 1 (the Boolean top element). See, e.g., Fig. 1, where we have a non-Archimedean extension of Boolean algebra with just two members. In the last case, any member of semantic continuum, which is distinct from zero, is greater than unit.

The Boolean top element is called *extensional unit*, the Boolean bottom element is called *extensional zero*. The infinite tuple $\langle 1, 1, \dots \rangle$ is called *intensional unit*, the infinite tuple $\langle 0, 0, \dots \rangle$ is called *intensional zero*. A family of elements $\langle x_1, x_2, \dots, x_{2^n} \rangle = X_n$ is ordered for each level $n > 1$ as follows: extensional unit $\leq \dots X_n \leq X_{n+1} \leq$ intensional unit.

Each new level of semantic continuum contains extensional unit, respectively a Boolean algebra, but also it has a depth, i.e. it contains all previous levels included to the intensional interval between intensional zero and intensional unit. In semantic continuum $A \vee \neg A$ is not equal to extensional unit.

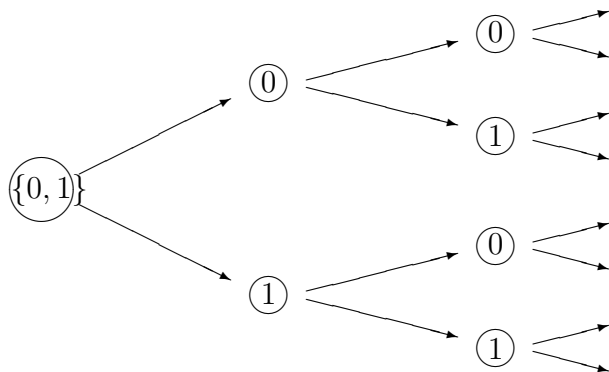


Figure 1: The 2-adic tree

Another example of semantic continuum will be obtained if we build up a non-Archimedean extension of the unit interval $[0, 1]$, see Fig. 2. In this case we have semantic continuum of fuzzy logic if it preserves all basic properties of the latter.

Semantic continuum could have a warpage within epistemic pictures. This warpage expresses meaning losses, and these losses in turn are reflected in states of affairs, i.e. they determine a special view of intensional ordering relations on $*\mathfrak{A}$. Kinds of epistemic pictures were proposed by Aristotle, Chrysippus, Dharmakirti, Hegel and so on. *Real logic* studies kinds of intensional ordering relations on $*\mathfrak{A}$. Examples of this logic are as follows: Aristotle's analytics, Hegel's speculative logic, etc.

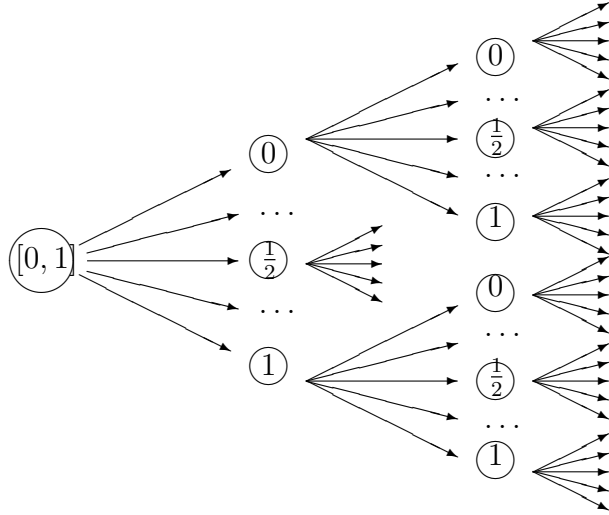


Figure 2: The non-Archimedean tree

As an example of meaning losses we take the first level $\langle x_1, x_2 \rangle = X_1$. The relation $A \vee \neg A$ is extensional unit. However, we may observe the following meaning losses: “all living beings are alated or not alated.” Species ‘ants’ and ‘glowworm’ do not satisfy this property (Aristotle’s *Parts of Animals*) – they are both alated and not alated. Aristotle’s criticism against dichotomists in the classification of animals follows from this.

A logical interval (a meaning of word) of a curved semantic continuum is ascribed to an allocation of substance (energy) in the Universe. The given interval is defined by a warpage function on semantic continuum.

Semantic continuum plays role of description for any world, by fixing quantity losses in applications of the certain level on a real state of affairs. Hence, thinking is possible only as restricted, because meaning losses take place in epistemic space of the world. Too large number of level allows us to calculate meaning losses. Most likely, at the level of elementary animals the first level of semantic continuum X_1 is enough: well – bad, useful – useless, etc. Thus, using real logic is possible for the explanation of some phenomena of coevolution.

So, logical intervals of real logic are made out by meaning losses, to each interval we ascribe a special allocation of substance. For the first time, Democritus started talking that logic should have a physical analogue. Hence, his atom is in fact a logical interval as probability measure of allocation of substance. Since then Ancient and other philosophers have stated that any

logical system has as well physical analogues besides algebraic (syntactic) properties.

Limits of any (even superhuman) thinking, i.e. the possibility to be the observer, are set up by plurality of possibilities of energy/substance distribution in the Universe. Semantic continuum is a class of all probability measures for any states of existential continuum of physics. Quite probably that another plurality of a possible energy distribution will generate essentially another semantic continuum, having created the other Universe. But such Universe is at all inconceivable, since our thinking is capable to build up logical space only for our world. Thus, we are speaking of logical monism.

Any thought concerning object is the interval including intervals of similar objects (in turn, these intervals are probability measures of specific allocation of substance). We could ask if the thought is a creation of the world backwards. For example, if since times of Big Bang the intensionality of logical intervals of the Universe has been incrementing. Or, if curved semantic continuum is isomorphic to the Universe. Probably, the thought is capable to feature a real state of affairs only because it recreates probability measures of the major evolution of the Universe. Intensional logical intervals, reproduced by thought, cannot be other, than Universe intervals as a whole.

In such view the problem of interaction of the ideal and real is solved. The largeness of intensional logical interval depends on the precision, how this interval features a state of affairs. As a result, such notions as ‘spirit,’ and ‘state’ may be verified due to epistemic pictures from semantic continuum. The larger a warpage of semantic continuum is, the ‘more really’ a think and the less a length of its extensional logical interval is. A special energy distribution realizes an appropriate intensional logical interval, hence, the observer, resorting to semantic continuum, is not possible without an appropriate energy distribution in the Universe. Each level of real logic could be corresponded to an appropriate level of allocation of substance: from the Big Bang, the evolution of the Galaxy, solar system, the Earth up to the evolution of life. Naturally, between them there is no isomorphic relation, but they are semantically mapped. Probably, this mapping relation varies depending on a system level. Perhaps, the isomorphic relation is possible for the universal observer (the Lord thinks by things and not by thoughts).

The human being is a substance organized in a special way of albuminous type, thereby he satisfies probability measures of real logic by his morphology and physiology. At the same time, he is capable to realize semantic continuum. Thus, the human being not only himself is distributed in a system of intervals of real logic thanks to his body and his physiology, but also he is capable to predict possible states of intervals in order to guide and change them, and he does it thanks to the knowledge of semantic continuum. It is

possible to claim that real logic is a kind of inductive logic. Taking real logic into account, measuring losses of semantic continuum in each concrete case potentiates the human activity.

The phenomenon of human rationality is related not so much to biological features of his organism, but much more to physical performances of macrocosm (that is reflected by logical space), the latter is a unique physical analogue.

The semantic divinity, or logical religion (logical space of any possible religion), is a next warpage of real logic. The first is not possible without a special allocation of substance within our planet: from the Big Bang to the human being and social topology (communities). For example, without the sun, grasses etc. there is not its semantic system. Religion closes a sequence of warpage over semantic continuum. Its warpage of epistemic pictures consists in that religion is not possible without visual environment. On the Moon it is impossible to pray. The Earth represents our macrocosm, i.e. a semantic system which religion distorts.

Meanings of physics are based on the physical depth of empirical space and hypotheses about relations on physical analogues. However, its meanings should be grounded on the physical depth and real logic (though physics hypotheses are given from informal using semantic continuum and its warpings). The physical depth of macrocosm is in two worlds: microcosm and megaworld. In logical religion macrocosm is a physical analogue (physical depth). Macrocosm is designated among other worlds (due to that there is the observer). Macrocosm is an intersection of all worlds, it contains a universal depth. Thus, in the actual macrocosm there are special regularities which are given due to the intersection of worlds. For example, logical religion is a warpage of epistemic pictures, i.e. a warpage of macrocosm pictures, instead of macrocosm with its physical depth itself.

The actual world is universal epistemic space (its various mappings as epistemic patterns are possible) with a physical depth. In the actual world we see the perpetual number of epistemic pictures as mappings from semantic continuum onto the world (examples of epistemic pictures are Aristotle's philosophical system, Vasubandhu's system, etc.). In turn, epistemic functions map universal epistemic space or any epistemic pictures according to biological and other requirements. Models of epistemic functions form a social topology. Universal epistemic space is superimposed on real space – we could ascribe a sensation as physical depth to each logical interval. Though universal epistemic space itself has no physical depth – in this sense physical analogues are less, than extensional zero.

The word itself (interval of universal epistemic space) has no reference (for this it needs the observer, somebody who is informed about universal

epistemic space and able to feel its physical depth). At the same time, the physical depth without human being is no reference, too. For example, combustion as the sequence of exothermic chemical reactions between a fuel and an oxidant is not the referent of word 'fire.' It is an antecedent for the succedent 'heat' (its explanation), because combustion, obtained by physical deepening within a chemical theory into the logical interval 'fire,' only explains the property 'heat' of 'fire.' But 'combustion' is more logically unclear, than 'heat.' We could add that 'fire' does not have genus. This fact cannot be explained by 'combustion,' then this means that 'combustion' is more logically unclear, than 'fire,' hence it is not its referent (the logical antecedent that is logically stronger (or equal to) this word). The notion 'combustion' represents only the physical depth (partial antecedent) of 'fire.' Or one more example. 'Heaven' in the form of physical depth has the beams refracted in atmosphere, but it does not explain (it is not an antecedent for) its greatness, divinity.

The physical depth as a whole (closed on itself) has relations outside of epistemic space, therefore there exist semantic functions mapping from semantic continuum onto the world, in particular epistemic functions. The corresponding relation between words (intervals of epistemic space) and ways of allocation of substance/energy generally is casual (physical depth is less than extensional zero). At animals it is more casual, e.g. the fear of fire cannot be directly explained by 'combustion.' Words are probability measures, and physical depth is their explanation which cannot be complete. Only the Lord does not think by probability measures – in Him there is the full isomorphism of concrete words and concrete allocation of substance. For the human being only the isomorphism of real logic and principles of allocation of substance (universal physical analogue) is given.

In a microscope we see something besides of epistemic pictures. Epistemic logic, i.e. logic of macrocosm, represents hyperspace in which there are no molecular communications and planetary systems – a physical depth is absent. If inside of Aristotle's epistemic pictures we take a microscope of any magnification we will find out nothing, as well as with a telescope. There are no microcosm and megaworld in epistemic logic. Semantic functions of mapping, in particular epistemic functions, do not allow us to see the physical depth of the actual world if they do not guess corresponding physical analogues. However, this hyperspace is not the pseudo-world. Real logic is unique, then in the same measure epistemic logic is unique. Using regularities of epistemic logic it is possible to construct only the pseudo-worlds if they do not coincide with the actual world, because into modified epistemic logic nobody could enclose a physical depth and a warpage of semantic continuum within the limits of logic religion. The original and unique actual world is the

world in which at any point there is a depth (physical or another). Taking into account the fact that in the actual world all completeness of semantic depth is set up and there is a unique observer (the human being), there is only one real logic and only one epistemic logic. The extraterrestrial reason in our Universe is not present!

References

- [1] Andrew Schumann (Ed.) Logic in Religious Discourse. Ontos Verlag, Frankfurt & Paris, 2009.
- [2] Schumann, A., Non-Archimedean Valued Sequent Logic, *Eighth International Symposium on Symbolic and Numeric Algorithms for Scientific Computing (SYNASC'06)*, IEEE Press, 89–92, 2006.
- [3] Schumann, A., p -Adic Multiple-Validity and p -Adic Valued Logical Calculi, *Journal of Multiple-Valued Logic and Soft Computing*, 13 (1–2), 2007, pp. 29–60.
- [4] Schumann, A., Non-Archimedean Valued Predicate Logic, *Bulletin of the Section of Logic*, 36/ 1 – 2, 2007, pp. 67–78.
- [5] Schumann, A., Non-Archimedean Fuzzy Reasoning, *Fuzzy Systems and Knowledge Discovery (FSKD'07)*, IEEE Press, 2007.
- [6] Schumann, A., Non-Archimedean Valued and p -Adic Valued Fuzzy Cellular Automata, *Journal of Cellular Automata*, (accepted).