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Summary of the Articles

On Non-eliminability of the Cut Rule and the Roles of Associativity and Distributivity in Non-commutative Substructural Logics

Takeshi UENO, Koji NAKATOGAWA, and Osamu WATARI

We introduce a sequent calculus FL' ,which has at most one formula on the right side of sequent, and which excludes three structural inference rules, i.e. contraction, weakening and exchange. Our formulations of the inference rules of FL' are based on the results and considerations carried out in our previous papers on how to formulate Gentzen-style natural deduction for non-commutative substructural logics.

Our present formulation FL' of sequent system for non-commutative substructural logic, which has no structural rules, has the same proof strength as the ordinary and standard sequent calculus FL (Full Lambek), which is often called Full Lambek calculus, i.e., the basic sequent calculus for all other substructural logics. For the standard FL (Full Lambek), we use Ono's formulation.

Although our FL' and the standard formulation FL (Full Lambek) are equivalent, there is a subtle difference in the left rule of implication. In the standard formulation, two parameters 1 and 2 (resp.), each of which is just an finite sequence of arbitrary formulas, appear on the left and right side (resp.) of a formula appearing on the left side of the sequent on the upper left side the left rule (which corresponds to ^{0} in FL') . On the other hand, there is no such parameter on the left side of the sequent on the upper left side in the left rule for ^{0} of our system FL. In our system FL', 1 is always empty, and only 2 is allowed to occur in the left rule for 0 (similar differences occur in the multiplicative conjunction, additive conjunction and additive disjunction). This subtle difference between our system FL' and the standard system FL (Full Lambek) matters deeply, for we are led to a construction of proof-figures in FL', which show how the associativity of multiplicative conjunction and the distributivity of multiplicative conjunction over additive disjunction are involved in the eliminations of the cut rule in those proofs. We clarify and specify how associativity and distributivity are related to the non-eliminability of an application of the cut rule in those proof- figures of FL'.

Sellars' Absolute Process and the Ontology of Individuals

Masaru SHIRAHATA

This paper tries to locate W. Sellars's ontology of absolute processes, presented in his Carus Lecture, within the ontological tradition concerning individuals. We use J. J. E. Gracia's work on individuality as a frame of reference, which comprises the summary and criticism of various ontological standpoints, found in from the ancient to the contemporary literature. Gracia' own view, very similar to what he calls strong derivative nominalism in the tradition, allows us to hold that when exemplified, features themselves can be seen as individuals, which we will call individuated features. After refurbishing the view with respect to the roles of the space-time and local spatio-temporal structures, we use the ontology of individuated features for the framework to understand Sellars' absolute processes.

The Interculcural Perspective : Ortege Y Gasset, Wallner and Nakatogawa

Lydia de Tienda PALOP

Approaching a culture different from one's own is always a transforming experience to a greater or lesser extent. It is not the same the vital event that occurs as a consequence of the narrations about other cultures than what happens with the activity of tourism or with the experience of having lived in a society culturally different from the one of origin. However, all the experiences that imply that openness, that attitude of listening to the different, that initiatory curiosity towards the mystery of the other, definitely influence the self-understanding of oneself and of one's culture. And this experience, in the words of Prof. Koji Nakatogawa, substantially modifies one's culture.

In this paper I will analyze the method of strangification developed by Friedrich Wallner that starts from his ontological conception of constructive realism to characterize a methodology that legitimizes the construction of the intercultural perspective.

Inference from Smoke to Fre : from the Viewpoint of Topos Theory

Yohei FUKAYAMA

The first aim of this paper is to explicate the intention of a picture which was found on the introduction Web page of emeritus Koji Nakatogawa at Hokkaido University and which visualizes inference from seeing smoke at some place to the existence of fire there. It turns out that the picture is influenced from a book whose authors include mathematician F. W. Lawvere and that the intention is clarified by using Lawvere's elementary topos theory. The second aim is to point out a conflict between Nakatogawa's view that "static" set theory is opposed to "dynamic" category theory and Lawvere's conception of the topos of abstract sets and that of variable sets.

On Implicational Connectives of Quantum Logics analyzed in Gentzen-style Natural Deduction for Non-commutative Substructural Logics

Takeshi UENO

Birkhoff and von Neumann introduced Quantum Logic, in which the commonly agreed definition of the implicational connective has not yet achieved. Kotas proposed six formulations to define six implicational connectives. Ozawa introduced symmetrical relations among these implicational connectives. NFL is a Gentzen-style natural deduction for non-commutative substructural logic, which excludes three structural inference rules, i.e. contraction, weakening and exchange. We will construct proof figures of NFL, augmented with other inference rules, to establish relations among the implicational connectives, so that the relevancies of inference rules, including structural rules such as exchange rule, are clarified.

Could the Fundamental Laws of Nature be Inferred Logically (Mathematically) from Only a Very Few Axioms?

Ramin ZAHEDI

This article is a summary of an expanded version : R. Zahedi, "On the Logical Origin of the Laws Governing the Fundamental Forces of Nature : A New Axiomatic Matrix Approach", Archive for Studies in Logic (AFSIL), Hokkaido University Publs., 16 (2) : 1-97, 2015. In this expanded version, as a new mathematical approach to origin of the laws of nature, using a

new basic algebraic axiomatic (matrix) formalism based on the ring theory and Clifford algebras (presented in Sec. 2), "it is shown that certain mathematical forms of fundamental laws of nature, including laws governing the fundamental forces of nature (represented by a set of two definite classes of general covariant massive field equations, with new matrix formalisms), are derived uniquely from only a very few axioms" ; where in agreement with the rational Lorentz group, it is also basically assumed that the components of relativistic energy-momentum can only take rational values. Based on the definite mathematical formalism of this axiomatic approach, along with the C, P and T symmetries (represented by the corresponding quantum matrix operators) of the fundamentally derived field equations, it is concluded that the universe could be realized solely with the (1+2) and (1+3)-dimensional space-times. On the basis of these discrete symmetries of the derived field equations, it has been also shown that only left-handed particle fields (along with their complementary right-handed fields) could be coupled to the corresponding (any) source currents.