Workshop "Inferences and Proofs"
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CEPERC – FRUMAM

Cesare Cozzo
Cogency and context

A cogent inference compels us to accept its conclusion, if we accept its premises. Should a philosophical explanation of cogency consider the fact that inferences occur in a context? What kind of context can be relevant to an explanation of cogency? What is the relevant notion of inference? Does cogency in some sense depend on context? If it does, in what way does context bear upon the compelling force of an inference? These are the questions I will address.

Gabriella Crocco
Informal rigour and proofs

Starting from Georg Kreisel's concept of informal rigour, the purpose of this paper is to discuss various hints concerning the notion of proof given by Kurt Gödel in his published and unpublished work and to compare them with the contemporary discussion about the notion of the epistemic power that a proof should convey in order to compel one to accept its conclusion. In his 1951 paper, Gödel seems to suggest that there are three essential characteristics of a formal proof (*i.e*. a proof that can be performed by a Turing machine): finitude: locality and independence from meaning. He seems also to suggest that at least the last two of them have to be dropped up in the case of subjective mathematics (mathematics that can be afforded by a human being through the notion of proof). Is this Gödelian notion of a non-formal rigorous proof compatible with the notion of inference? We will try to give an answer to this question.

Kosta Došen
Gödel on deduction

Godel's views concerning deduction will be examined in the light of the unpublished notes for the elementary logic course he gave at the University of Notre Dame in 1939. In this course he formulated a natural deduction system and spoke about the advantages of this manner of presenting logic.

References

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Nissim Francez
Natural deduction for two connexive logics

I propose two natural deduction systems $N^{Ør}$ and $N^{Øl}$, for non-classical interactions of a certain kind between negation and implication, that can be seen as variants of connexive logics. These variations are inspired by a certain use of negation and implication in natural language. I propose the natural deduction systems $N^{Ør}$ and $N^{Øl}$ as meaning-conferring proof-systems, not appealing to any many-valued model theory as a semantics. The model-theory is used mainly as an auxiliary tool for establishing non-derivability, for example of some classical formal theorems (or, more generally, classical derivability claims) that are not provable (not derivable) in $N^{Ør}$ and $N^{Øl}$. The relation between implication and negation in the system $N^{Ør}$ is similar to the one by Cantwell and one by Cooper, the former unaware of the latter. The system $N^{Øl}$ seems to be new.

Per Martin-Löf
Judgement and inference

When semantically justifying, or validating, a rule of immediateinference, one invariably begins by saying: assume the premises, whereuponfollows an explanation serving to justify the conclusion. Since both thepremises and the conclusion of an inference are judgements, theseassumptions are judgements in contradistinction to the propositions whichare assumed in natural deduction. Göran Sundholm has called them epistemicassumptions in his paper Implicit epistemic aspects of constructive logic,Journal of Logic, Language, and Information 6, 191-212, 1997. Beingjudgements rather than propositions, there arises the question: of whatmood (modality in Kant's idiom) are they? Just as, when making anassumption in natural deduction, we are not merely considering (Russell's idiom) a proposition, in the case of an epistemic assumption, we are notmerely considering it, that is, considering what it means. So theproblematic mood, in Kant's terminology, is excluded. There remains thequestion whether it is assertoric or apodictic. This is tantamount to thequestion: are we assuming that the assumption judgements have been made orare we, which would be stronger, assuming that they have beendemonstrated? I shall opt for the first alternative, that is, theassertoric mood, thereby avoiding an otherwise disturbing circularity in the definition of the notion of demonstration.

Dag Prawitz
How the concepts of inference and proof intertwine

Peter Schröder-Heister
Logic beyond logic

The paper extends the pattern of inversion, which is common from the proof-theoretic semantics of logical systems, to general rule based systems and shows that seemingly logic-based behaviour extends to areas beyond logic. This is particularly related to rule systems with free variables as in logic programming, and to the inversion principle first considered by Lorenzen already in 1950s. Its significance for current investigations in the proof-theoretic semantics of logic is pointed out.

Göran Sundholm
***Grundlagen*, §17**

I consider the difference between propositions and judgemental contents, as well as the difference between inference, from judgement(s) to judgement, and

consequence, be it logical or not, among antecedent and consequent propositions. Furthermore I resist the customary (Bolzano) reduction of inferential validity to the (logical) holding of consequence. Against this background, after a close reading, Frege's treatment in GLA, § 17, drawing also upon relevant passages in the *Logik* of the 1880's, *Grundlagen der Geomterie*, II:nd series, part 3, and *Gedankengefüge*, is found wanting.

Luca Tranchini
Proof, meaning and paradoxes: Some reflections

The aim of the paper is to show how proof-theoretic semantics (PTS) provides the tools to make sense of the idea that a paradoxical sentence, though semantically defective, is nonetheless meaningful, and it is in virtue of our understanding its meaning that we classify it as paradoxical. We will first show that PTS provides the means to distinguish between paradox and other kinds of semantic defectiveness. We will then show that the PTS characterization of paradox lends itself to be recast using the notion of isomorphism from categorial proof-theory, thereby providing further evidence for taking this notion as a possible explanans of identity of meaning. Finally, we will argue that the watershed between paradoxical and non-paradoxical meaning explanations bears strong analogies to the one between realism and anti-realism.

Gabriele Usberti
Inference and epistemic transparency

In his paper *Explaining deductive inference* Prawitz states what he calls “a fundamental problem of logic and philosophy of logic”: the problem of explaining “why do certain inferences have the epistemic power to confer evidence on the conclusion when applied to premisses for which there is evidence already?”. In thi paper, I suggest a way of articulating, and partly modifying, the intuitionistic answer to this problem in such a way as to satisfy a requirement I argue to be crucial for an intuitionistc theory of the meaning of the logical constants: the requirement that evidence is epistemically transparent.