



# SEMINÁŘ LOGIKY SEMINAR OF LOGIC



Gabriel Sandu (emeritus professor, University of Helsinki):

## Mathematical Truth as Truth in the Mathematical Universe

The starting point of this essay is the conviction that there is a primary, absolute notion of mathematical truth: This is truth in the relevant universe. Thus “ $7+5=12$ ” is truth in the arithmetical universe  $1,2,3,\dots$ . And the same idea applies analogously to set-theoretic truth, real analysis truth, and even logical truth. Correlated with this notion of natural truth, there is also a notion of natural meaning. A statement  $P$  means what it does in ordinary mathematical English, which we may load into a (first order) notation and stipulate that it means this or that natural English meaning; the statement  $P$  is true or false in the relevant universe in virtue of this natural semantic meaning. I will argue that this bond between mathematics, logic and universe-truth has been broken by the creation of modern “technology” consisting of two formal systems, proof-theory (syntactic algebra) and model theory (model algebra). They led to the reformation of the syntax of logic and mathematics and to the “modelization” of natural meaning through the notion of satisfaction in a model. Completeness, compactness and Lowenheim-Skolem theorems are now secured for the surrogate semantically deformed meanings. Thus a meta-mathematical apparatus which was primarily designated for assessing consistency of formal systems and independence results has been wrongly lifted to the status of a genuine semantic theory for a mathematical language. And the same tendency has been manifested in the investigation of the semantics of natural language outside mathematics. The motif of our essay is then to reforge the bond between mathematics and Universe-Truth. It is inspired by two seminal contributions to the field, one due to Jaakko Hintikka and the other to Hilary Putnam. The presentation draws on two papers, Joseph Almog, Vesa Halava and Gabriel Sandu, “The ultimately true natural logic and the completeness ideal” forthcoming; and Joseph Almog, Universe, Infinity, sets: Outer/Inner Models vs. Reality, forthcoming in JPL.

**Thursday 25/9/2025 | 14.00 CET**

Meeting room („zasedačka“), Institute of Philosophy CAS, Jilská 1, Prague 1