

► HAJNAL ANDRÉKA,

Back and forth between logic and relativity theory. Part II.

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This talk is strongly related to the talk of István and Péter Némethi. In the two talks together, we will show how one can build up relativity theories (including general relativity and cosmology and Einstein's $E = mc^2$) purely within first-order logic, as theories in the sense of logic, and with no other prerequisites than some familiarity with the basics of logic. This will provide, as a byproduct, a logic based foundation for relativity (in analogy with the foundation of mathematics) as well as a conceptual analysis for relativity theories. Further, it will provide a gentle (and streamlined) introduction to relativity for the questioning mind or for the logically minded.

In the other direction, general relativity leads to hyper computation which in turn can be brought to be relevant to logical issues like Hilbert's programme. As a second feedback to logic, in analyzing relativity theory we get motivation for elaborating definability theory in the direction of defining new sorts, or new universes of new entities as opposed to defining only new relations on old entities.

Actually, we will touch upon more fields than the two mentioned in the title, e.g., cosmology, black holes and wormhole theory will be brought into the picture.

More detail is available on Istvan Nemeti's homepage. The reported work is joint with Judit X. Madarász [1], Péter Némethi, Gergely Székely [2], and Renáta Tordai.

[1] MADARÁSZ, J. X., *Logic and Relativity (in the light of definability theory)*, PhD Dissertation, Eötvös Loránd University, Budapest, 2002.

[2] SZÉKELY, G., *First-Order Logic Investigation of Relativity Theory with an Emphasis on Accelerated Observers*, PhD Dissertation, Eötvös Loránd University, Budapest, 2009.