



PŘEDNÁŠKOVÁ SÉRIE LECTURE SERIES

Michal Hladky (University of Geneva)

On computation and simulations in neurosciences

The concept of computation plays several different roles in neuro- and cognitive sciences and related computational models and simulations. The application of the classical computability framework (Turing [1936] 2004) was criticised for a multitude of different reasons – functional, structural, bio-physical or ontological mismatches with the cognitive functions or their biological implementations. If such objections are adequate, one might suspect that computational models provide a very limited insight in these domains. Using model theory and computability theory, I will first clarify and disambiguate various concepts of models and simulations and of notions related to computation. Subsequently, I will present four case studies illustrating different notions of models and simulation and discuss their relation to various aspects of computation – (Markram et al. 2015; Eliasmith et al. 2012; Kuncic et al. 2020; Jonas and Kording 2017). The last study demonstrates, through simulations and in silico experimentation, the limitations of established methods used in empirical neurosciences. I will present how the same insights could be derived from the classical computability theory.

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Meeting room, Institute of Philosophy, Czech Academy of Sciences, Jilská 1, Prague