MATTHIAS SCHRÖDER, Universität der Bundeswehr München, Werner-Heisenberg-Weg 39, 85577 Neubiberg, Germany
Topology in Computable Analysis

Computable Analysis studies computability over the real numbers and related spaces. Since computable functions are continuous in a certain sense, topology plays an important role in this theory. The cartesian closed category QCB of quotients of countably based topological spaces turns out to be an appropriate category for modelling the topological aspects of higher type computation.

In this talk, we discuss topological properties of the Kleene–Kreisel continuous functionals and their surprising relationship to an open problem in exact real-number computation. We show that the sequential topology on the space $\mathbb{N}^{(\mathbb{N}^{\mathbb{N}})}$, which is the space of Kleene–Kreisel continuous functionals of type 2, is neither zero-dimensional nor regular. Moreover, we establish non-regularity of further function spaces formed in the cartesian closed category of Hausdorff k-spaces. $\mathrm{k\text{-}Haus}$ is one of the categories from which $\mathrm{QCB\text{-}Haus}$ inherits its cartesian closed structure.