Ciências ULisboa

SEMINÁRIO
LÓGICA MATEMÁTICA

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On the unification of functional interpretations

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Abstract:
Since Godel published his functional ("Dialectica") interpretation in 1958, various other functional interpretations have been proposed. These include Kreisel's modified realizability, the Diller-Nahm variant of the Dialectica interpretation, Stein's family of interpretations, and more recently, the bounded functional interpretation, the bounded modified realizability, and "Herbrandized" versions of modified realizability and the Dialectica. It is then natural to ask how are these different interpretations related to each other and what is the common structure behind all of them.

These questions were addressed by Paulo Oliva and various co-authors in the "unification programme". Starting with a unification of interpretations of intuitionistic logic, which was followed by various analysis of functional interpretations within the finer setting of linear logic, a proposal on how functional interpretations could actually be combined in so-called hybrid functional interpretations, and the inclusion of truth variants in the unification.

This unification programme has so far been unable to capture the two more recent families of functional interpretations, namely the bounded functional interpretations, and the Herbrandized functional interpretations.

In this talk I will present a more general framework for unifying functional interpretations, based on two families of parameters, one for interpreting the contraction axiom, and another for interpreting typed quantifications, which allow to include in the unification the more recent bounded and Herbrandized functional interpretations. I will start by presenting this parametrised interpretation in the setting of affine logic. Then, via the two well-known Girard translations from intuitionistic logic into affine logic, one obtains two parametrised interpretations of intuitionistic logic. I will explain how all of the functional interpretations mentioned above can be recovered by suitable choices of these two parameters and how this framework can be used to discover some new interpretations.

(This is joint work with Paulo Oliva)

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