Decorating proofs

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Abstract

If a formula contains existential quantifiers in strictly positive positions, then – according to Brouwer, Heyting and Kolmogorov – it can be seen as a computational problem. A proof then provides a solution to this problem, and one can machine extract (via a realizability interpretation) this solution in the form of a lambda calculus term involving recursion operators, which can be seen as (and translated into) a functional program. We concentrate on the question how to control at the proof level the complexity of the extracted programs. It is shown that every proof admits an optimal decoration with uniform (U. Berger 2005) or non-computational variants of universal quantifiers and implications. (Joint work with Diana Ratiu).