Logikseminariet Stockholm–Uppsala

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A variable free version of the substitution calculus for dependent type theory

Take one piece of the substitution calculus for dependent type theory [1, 3] and one piece of de Bruijn's notation for λ-calculus with nameless dummies [2] and stir. Out comes the variable free substitution calculus for dependent type theory. The motivation is that we want to write functions in the old-fashioned way, using variables, but give them meaning by translating them into compositions of projections and primitive functions, keeping in mind the extra complications introduced by dependent types and variable binding operations. Before performing the translation, it must be rigorously defined what a composition of projections and primitive functions is, and this rigorous definition is given by the variable free substitution calculus.

References

[1] Abadi, M. et al., Explicit substitution. In *J. Funct. Program.* 1(4):375–416, 1991.

[2] de Bruijn, N. G., Lambda calculus notation with nameless dummies, a tool for automatic formula manipulation, with application to the Church-Rosser theorem. In *Indag. Math.* (Proc.) 75(5):381–392, 1972.

[3] Tasistro, A., *A formulation of Martin-Löf's type theory with explicit substitutions*. Lic. thesis, Chalmers, 1993.

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