

TLCA List of Open Problems

<http://tlca.di.unito.it/opltlca/>

Updated February 4, 2014

Problem # 12

Submitted by Paweł Urzyczyn

Date: 1993

Statement. Does the typability hierarchy of F_ω collapse on F_1 ?

The type assignment system F_ω can be split into an infinite hierarchy of subsystems F_n (see [Girard, 1986]), where F_0 is the usual polymorphic lambda-calculus (system F), and F_n admits constructors of *order* n . (A type is a constructor of order zero, a constructor of order one is a function acting on types, and a constructor of order $n + 1$ has arguments of order n .) It is conjectured [Urzyczyn, 1997] that every pure lambda-term typable in F_ω is typable already in F_1 .

Remark: An incorrect proof of the conjecture appeared in [Malecki, 1997].

References

- [Girard, 1986] Girard, J.-Y. (1986). The system F of variable types, fifteen years later. *Theoretical Computer Science*, 45:159–192.
- [Malecki, 1997] Malecki, S. (1997). Proofs in system F_ω can be done in system F_ω^1 . In van Dalen, D. and Bezem, M., editors, *Computer Science Logic*, volume 1258 of *Lecture Notes in Computer Science*, pages 297–315. Springer-Verlag.
- [Urzyczyn, 1997] Urzyczyn, P. (1997). Type reconstruction in F_ω . *Mathematical Structures in Computer Science*, 7(4):329–358.