

Problem #4 (Solved !)

Originator:

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Summary: Is it decidable whether a term is typable in the second-order $\lambda 2$ calculus?

One of the outstanding open problems in typed lambda calculi is the following: Given a term in ordinary untyped lambda calculus, is it decidable whether it can be typed in the second-order $\lambda 2$ calculus? See [Bar91][Hue90].

Remark

This question has been solved in the negative. In [Wel94] J.B. Wells proves that given a closed, type-free lambda term, the question whether it is typable in second-order $\lambda 2$ calculus, is undecidable. Moreover, given a closed type-free lambda term M and a type σ , then it is also undecidable in second-order $\lambda 2$ calculus whether M has type σ .

Bibliography

- [Bar91] Henk Barendregt. Lambda calculi with types. In S. Abramsky, D. M. Gabbay, and T. S. E. Maibaum, editors, *Handbook of Logic in Computer Science*. Oxford University Press, Oxford, 1991. To appear.
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- [Wel94] Joe B. Wells. Typability and type checking in the second-order λ -calculus are equivalent and undecidable. In Samson Abramsky, editor, *Ninth Symposium on Logic in Computer Science*, Paris, France, July 1994. IEEE.