

TLCA List of Open Problems

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Problem # 19 [SOLVED]

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Statement. Does easiness imply simple easiness?

Problem Origin. The problem was posed by Fabio Alessi and Mariangiola Dezani-Ciancaglini.

According to [Jacopini, 1975] a closed term E is *easy* if, for any other closed term M , the theory $\lambda\beta + \{M = E\}$ is consistent.

[Alessi and Lusin, 2002] introduce the notion of *simple easiness*: roughly a term M is simple easy if given an arbitrary intersection type τ one can find a suitable pre-order on types which allows to derive τ for M . In the same paper the authors show that for each simple easy term E and for each arbitrary closed term M it is possible to build a λ -model in which the interpretations of E and M coincide.

Clearly each simple easy term is easy, but the vice versa is open.

Remark: The content of [Alessi et al., 2004] are some applications of simple easiness.

Solution: Alberto Carraro and Antonino Salibra announced a solution in February 2010, the solution is published in [Carraro and Salibra, 2012].

References

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- [Jacopini, 1975] Jacopini, G. (1975). A condition for identifying two elements of whatever model of combinatory logic. In Böhm, C., editor, *λ -Calculus and Computer Science Theory*, volume 37 of *Lecture Notes in Computer Science*, pages 213–219. Springer-Verlag.