-NoValue-

int.1 λ-definível Functions are Computable

lam:int:cmp: sec

lam:int:cmp: thm:lambda-computable

Teorema int.1. *If a partial function f is λ-definido by a lambda term, it is computable.*

Prova. Suppose a function f is λ-definido by a lambda term X. Let us describe an informal procedure to compute f. On input $m_0, \ldots, m_{n-1}$, write down the term $X\overline{m}_0 \ldots \overline{m}_{n-1}$. Build a tree, first writing down all the one-step reductions of the original term; below that, write all the one-step reductions of those (O.s., the two-step reductions of the original term); and keep going. If you ever reach a numeral, return that as the answer; otherwise, the function is undefined.

An appeal to Church's thesis tells us that this function is computable. A better way to prove the theorem would be to give a recursive description of this search procedure. For example, one could define a sequence primitive recursive functions and relations, "IsASubterm," "Substitute," "ReducesToInOneStep," "ReductionSequence," "Numeral," etc. The partial recursive procedure for computing $f(m_0, \ldots, m_{n-1})$ is then to search for a sequence of one-step reductions starting with $X\overline{m_0} \ldots \overline{m_{n-1}}$ and ending with a numeral, and return the number corresponding to that numeral. The details are long and tedious but otherwise routine. $\square$

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Referências Bibliográficas