

Quantitative Church–Rosser for $\lambda\beta$, $\lambda\beta\eta$

Proposition (Church–Rosser for $\lambda\beta$, $\lambda\beta\eta$)

If $M \overset{l}{\longleftarrow} \overset{r}{\longrightarrow} N$ then there exists a term P such that $M \rightarrow^m P^{k^*}$ and $N \rightarrow^n P^{k^*}$ where

- 1 $k = \#(\leftarrow)[0, r] \leq \min\{l, r\}$,
- 2 $m \leq \sqrt{2} r_{-1}(|M|)$, and
- 3 $n \leq \sqrt{2} l_{-1}(|N|)$ for $|M|, |N| \geq 4$.

