

$$(\lambda_x M)N \rightsquigarrow M[x \mapsto N] \quad \dots$$

$$\begin{array}{c} \lambda_w y \\ \parallel \\ \lambda_v y \end{array}$$

$$(\lambda_y x)[x \mapsto y] \equiv \lambda_z y$$

$$\lambda_x x \approx \lambda_y y \approx \lambda_z z \dots$$

- 1 $x[x \rightsquigarrow N] := N$
- 2 $y[x \rightsquigarrow N] := y$ за $y \neq x$
- 3 $(M_1 M_2)[x \rightsquigarrow N] := (M_1[x \rightsquigarrow N])(M_2[x \rightsquigarrow N])$
- 4 $(\lambda_y P)[x \rightsquigarrow N] := \lambda_y(P[x \rightsquigarrow N])$

Лема 1

Нека $M, N \in \Lambda$ и $x \notin \text{FV}(M)$. Тогва $M[x \mapsto N] \equiv M$.

Дока. со: Утв. по гл. 1. на $M[x \mapsto N]$

1) $M \equiv x$ — калкулација! $x \notin \text{FV}(M)$

2) $M \equiv y \neq x$ $M[x \mapsto N] \equiv y \equiv M$ ✓

3) $(M_1 M_2)[x \mapsto N] \stackrel{\text{def.}}{\equiv} (M_1[x \mapsto N])(M_2[x \mapsto N])$

$x \notin \text{FV}(M_1)$?

$\text{FV}(M_1) \subseteq \text{FV}(M) \stackrel{\text{def. FV.2}}{=} \text{FV}(M_1) \cup \text{FV}(M_2)$

и

$\text{FV}(M_2) \subseteq$

$\equiv M_1 (M_2[x \mapsto N]) \stackrel{\text{un}}{=} M_1 M_2$

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- 4 $(\lambda_y P)[x \rightsquigarrow N] := \lambda_y(P[x \rightsquigarrow N])$

Лема 1

Нека $M, N \in \Lambda$ и $x \notin \text{FV}(M)$. Тогав $M[x \mapsto N] \equiv M$.

$$1) M \equiv \lambda_y P$$

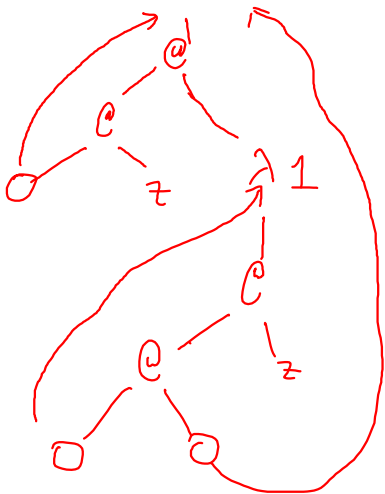
$$(\lambda_y P)[x \mapsto N] \stackrel{\text{def. 4}}{\equiv} \lambda_y P[x \mapsto N] \stackrel{\text{def. 3}}{\equiv} \lambda_y P$$

$x \notin \text{FV}(P)$? $x \notin \text{FV}(M) = \text{FV}(P) \setminus \{y\}$

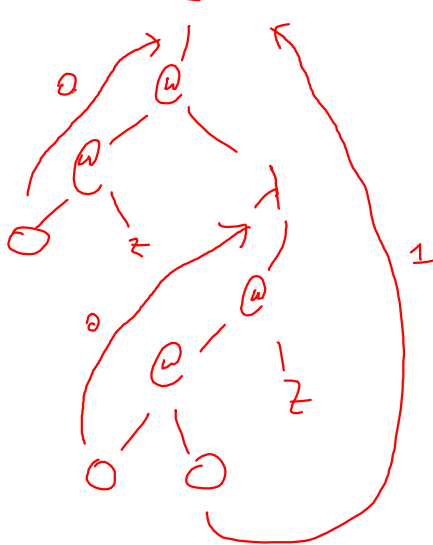
Можеме да кажеме, че $x \neq y$

$$\overline{\lambda_y P} \equiv \lambda_y P \quad \square$$

$\lambda_x (xz) (\lambda_y yz)$



$\lambda_u (uz) (\lambda_v vuz)$



$x, y \mapsto u, v$