第 1 回はじめに 解答

最終更新日 2020/05/11

問題 1. (省略)

問題 2-1. (省略)

問題 2-2. (省略)

問題 2-3. 前置の代入の定義は次の通り：

$$(s[y \mapsto a_0])(n) = n \tag{1}$$

$$(s[y \mapsto a_0])(x) = \begin{cases} a_0 & \text{if } x = y \\ s\ x & \text{if } x \neq y \end{cases} \tag{2}$$

$$(s[y \mapsto a_0])(a_1 \texttt{+} a_2) = (s[y \mapsto a_0])(a_1) \texttt{+} (s[y \mapsto a_0])(a_2) \tag{3}$$

$$(s[y \mapsto a_0])(a_1 \texttt{*} a_2) = (s[y \mapsto a_0])(a_1) \texttt{*} (s[y \mapsto a_0])(a_2) \tag{4}$$

$$(s[y \mapsto a_0])(a_1 \texttt{-} a_2) = (s[y \mapsto a_0])(a_1) \texttt{-} (s[y \mapsto a_0])(a_2) \tag{5}$$

これらの等式を用いて与えられた式を置き換える：

$$\begin{aligned}
& (((s[\texttt{y} \mapsto \texttt{1}])[\texttt{x} \mapsto \texttt{2}])[\texttt{y} \mapsto \texttt{3}])(\texttt{x+(y+3)}) \\
=\ & (((s[\texttt{y} \mapsto \texttt{1}])[\texttt{x} \mapsto \texttt{2}])[\texttt{y} \mapsto \texttt{3}])(\texttt{x}) \texttt{ + } (((s[\texttt{y} \mapsto \texttt{1}])[\texttt{x} \mapsto \texttt{2}])[\texttt{y} \mapsto \texttt{3}])(\texttt{y+3}) && \because \text{式 3} \\
=\ & ((s[\texttt{y} \mapsto \texttt{1}])[\texttt{x} \mapsto \texttt{2}])(\texttt{x}) \texttt{ + } (((s[\texttt{y} \mapsto \texttt{1}])[\texttt{x} \mapsto \texttt{2}])[\texttt{y} \mapsto \texttt{3}])(\texttt{y+3}) && \because \text{式 2} \\
=\ & \texttt{2+}(((s[\texttt{y} \mapsto \texttt{1}])[\texttt{x} \mapsto \texttt{2}])[\texttt{y} \mapsto \texttt{3}])(\texttt{y+3}) && \because \text{式 2} \\
=\ & \texttt{2+}((((s[\texttt{y} \mapsto \texttt{1}])[\texttt{x} \mapsto \texttt{2}])[\texttt{y} \mapsto \texttt{3}])(\texttt{y}) \texttt{+}(((s[\texttt{y} \mapsto \texttt{1}])[\texttt{x} \mapsto \texttt{2}])[\texttt{y} \mapsto \texttt{3}])(\texttt{3})) && \because \text{式 3} \\
=\ & \texttt{2+(3+}(((s[\texttt{y} \mapsto \texttt{1}])[\texttt{x} \mapsto \texttt{2}])[\texttt{y} \mapsto \texttt{3}])(\texttt{3})) && \because \text{式 2} \\
=\ & \texttt{2+(3+3)} && \because \text{式 1}
\end{aligned}$$