Abbreviated Syntax

Terms as defined in ?? are sometimes cumbersome to write, so it is useful to introduce a more concise syntax. We must of course be careful to make sure that the terms in the concise notation also are uniquely readable. One widely used version called abbreviated terms is as follows.

1. When parentheses are left out, application takes place from left to right. For example, if $M$, $N$, $P$, and $Q$ are terms, then $MNPQ$ abbreviates $(((MN)P)Q)$.

2. Again, when parentheses are left out, lambda abstraction is given the widest scope possible. From example, $\lambda x. MNP$ is read as $(\lambda x. MNP)$.

3. A lambda can be used to abstract multiple variables. For example, $\lambda xyz. M$ is short for $\lambda x. \lambda y. \lambda z. M$.

For example,

$$\lambda xy. xxyx \lambda z. xz$$

abbreviates

$$(\lambda x. (\lambda y. (((xx)y)x)(\lambda z. (xz)))).$$

**Problem syn.1.** Expand the abbreviated term $\lambda g. (\lambda x. g(xx))\lambda x. g(xx)$.

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**Bibliography**