第二周作业

邓博文

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1.

$$\begin{aligned} kuv &= (\lambda x.\lambda y.x)uv \\ &= (\lambda y.u)v \\ &= u \end{aligned}$$

2.

$$\begin{aligned} suvm &= (\lambda x.\lambda y.\lambda z.xz(yz))uvm \\ &= (\lambda y.\lambda z.uz(yz))vm \\ &= (\lambda z.uz(vz))m \\ &= um(vm) \end{aligned}$$

3.

$$\begin{aligned} skkm &= (\lambda x.\lambda y.\lambda z.xz(yz))kkm \\ &= (\lambda y.\lambda z.kz(yz))km \\ &= (\lambda z.kz(kz))m \\ &= km(km) \\ &= m \end{aligned}$$

4. 会无限次循环得到最开始的 term，理由如下

$$\begin{aligned} ww &= (\lambda x.xx)(\lambda x.xx) \\ &= (xx)[x := (\lambda x.xx)] \\ &= (x[x := (\lambda x.xx)])(x[x := (\lambda x.xx)]) \\ &= (\lambda x.xx)(\lambda x.xx) \\ &= ww \end{aligned}$$

5. 会得到无穷多个 d，理由如下

$$\begin{aligned} dd &= (\lambda x.xxx)(\lambda x.xxx) \\ &= (xxx)[x := (\lambda x.xxx)] \\ &= (xx[x := (\lambda x.xxx)])(x[x := (\lambda x.xxx)]) \\ &= (x[x := (\lambda x.xxx)])(x[x := (\lambda x.xxx)])(x[x := (\lambda x.xxx)]) \\ &= ddd \\ &= \underbrace{dd...d}_{\text{无穷个 d}} \end{aligned}$$

6.

$$\begin{aligned} (\lambda x.\lambda y.y)(ww)m &= (\lambda y.y)m \\ &= m \end{aligned}$$