

To Normal Form

$$\begin{aligned} & ((\lambda a.(\lambda b.b\ b)\ (\lambda b.b\ b))\ b)\ ((\lambda c.(c\ b))\ (\lambda a.a)) \rightarrow_{\beta} \\ & ((\lambda b.b\ b)\ (\lambda b.b\ b))\ ((\lambda c.(c\ b))\ (\lambda a.a)) \rightarrow_{\beta} \\ & ((\lambda b.b\ b)\ (\lambda b.b\ b))\ ((\lambda a.a)\ b) \rightarrow_{\beta} \\ & ((\lambda b.b\ b)\ (\lambda b.b\ b))\ b \end{aligned}$$

SKK = I

$$\begin{aligned} S\ K\ K &\equiv (\lambda x\ y\ z.x\ z\ (y\ z))\ (\lambda x\ y.x)\ (\lambda x\ y.x) \rightarrow_{\beta} \\ &(\lambda y\ z.(\lambda x\ y.x)\ z\ (y\ z))\ (\lambda x\ y.x) \rightarrow_{\beta} \\ &\lambda z.(\lambda x\ y.x)\ z\ ((\lambda x\ y.x)\ z) \rightarrow_{\beta} \\ &\lambda z.(\lambda x\ y.x)\ z\ (\lambda y.z) \rightarrow_{\beta} \\ &\lambda z.(\lambda y.z)\ (\lambda y.z) \rightarrow_{\beta} \\ &\lambda z.z \equiv I \end{aligned}$$