

$$\begin{aligned}
r_{2,2}^2 &= r_{2,2}^1 (r_{2,2}^1)^* r_{2,2}^1 + r_{2,2}^1 \\
&= (\epsilon + 00)(\epsilon + 00)^* (\epsilon + 00) + (\epsilon + 00) \\
&= (00)^*
\end{aligned}$$