

$$\underbrace{v^0 v^1 v^2 v^3 \cap (v^0 v^1 v^2)^*}_{z \in S_1} = v^2 v^3$$

$$\begin{aligned} \langle z, (v^0 v^2)^* \rangle &= \langle v^0 v^1 v^2 v^3, (v^0 v^1 v^2)^* \cup (v^0 v^2)^* \rangle \\ \langle z, (v^2 v^3)^* \rangle &= \langle v^0 v^1 v^2 v^3, (v^0 v^1 v^2)^* \cup (v^2 v^3)^* \rangle = \\ &= \langle v^0 v^1 v^2 v^3, (v^0 v^1 v^2 v^3)^* \rangle = 1 \end{aligned}$$

