

$$\begin{aligned}
(\mathbf{d} \circ \mathbf{g})(p^*, r) &= \bigvee_{q \in Q} \mathbf{d}(p^*, q) \wedge \mathbf{g}(q^*, r) \\
&\leq_{\text{DP}} \bigvee_{q \in Q} \mathbf{e}(p^*, q) \wedge \mathbf{h}(q^*, r) \\
&= (\mathbf{e} \circ \mathbf{h})(p^*, r).
\end{aligned}$$