



$$\begin{aligned}
& 1^{a^0} \times id_0 \text{ unique } \wedge \\
& \widehat{0^a \circ p_0} \times id_0 \text{ unique } \wedge \\
& id_0 \text{ unique } \wedge \\
& 1^{a^0} \times id_0 \circ \widehat{0^a \circ p_0} \times id_0 = (1^{a^0} \circ \widehat{0^a \circ p_0}) \times id_0 \implies \quad \text{(from)} \\
& (1^{a^0} \circ \widehat{0^a \circ p_0}) \times id_0 \text{ unique } \implies \\
& 1^{a^0} \circ \widehat{0^a \circ p_0} \text{ unique } \in 1 \rightarrow 1 \implies \\
& 1^{a^0} \circ \widehat{0^a \circ p_0} = id_1
\end{aligned}$$

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& 1^{a^0} \times id_0 \text{ unique } \wedge \\
& \widehat{0^a \circ p_0} \times id_0 \text{ unique } \wedge \\
& id_0 \text{ unique } \wedge \\
& \widehat{0^a \circ p_0} \times id_0 \circ 1^{a^0} \times id_0 = (\widehat{0^a \circ p_0} \circ 1^{a^0}) \times id_0 \implies \quad \text{(to)} \\
& (\widehat{0^a \circ p_0} \circ 1^{a^0}) \times id_0 \text{ unique } \implies \\
& \widehat{0^a \circ p_0} \circ 1^{a^0} \text{ unique } \in 0^{a^0} \rightarrow 0^{a^0} \implies \\
& \widehat{0^a \circ p_0} \circ 1^{a^0} = id_{a^0}
\end{aligned}$$

$$a^0 \cong 1 \blacksquare$$