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When does a map between topological spaces send discrete sets to discrete sets

Even if X is compact, $\pi_1 : X \times X \rightarrow X$ does not send discrete sets to discrete sets.

Consider

$$\begin{array}{c} [0, 1]^2 \\ \downarrow \pi_1 \\ [0, 1] \end{array}$$

and

$$\underbrace{\left\{ \left(\frac{1}{n}, \frac{1}{n} \right) \mid n \geq 1 \right\} \cup \{(0, 1)\}}_{\text{discrete}} \mapsto \underbrace{\left\{ \frac{1}{n} \mid n \geq 1 \right\} \cup \{0\}}_{\text{not discrete}}$$

Current note has 0 direct children and 0 total descendants.

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 - Topological spaces
 - map
 - When does a map between topological spaces send discrete sets to discrete sets

And it has 12 siblings.

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