$\{\} : T_{-3}$ — hEmpty

$\{*\} : T_{-2}$ — hContr

$\{\underbrace{*, \star}_{\partial I}\} : T_{-1}$ — hProp

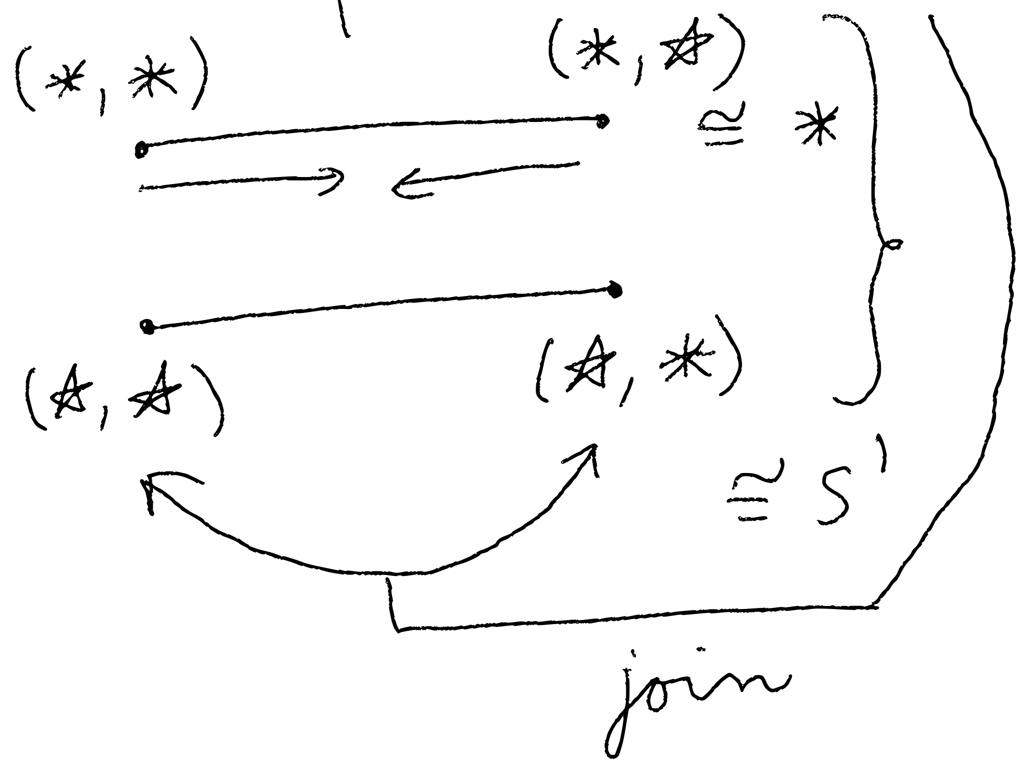
$\{\underset{S_0}{\cdot} \; \underset{S_0}{\cdot} \; \underset{\cdots}{\cdot}\} : T_0$ — hSet

$\{\underset{S_1}{\bullet} \quad \underset{S_1}{\bullet} \quad \underset{\cdots}{\cdots}\} : T_1$ — hGrpd

$$\Sigma S^0 = \frac{(S_0 \times I) \text{ — } cyl(S^0)}{(* \times I) \cup (S^0 \times \partial I)}$$

$$S^0 \cong \partial I$$

$$\Sigma\, \partial I = \Sigma\, S^0 = \frac{\partial I \times I}{\underbrace{(* \times I)}_{[(*,*)\ \ldots\ (*,\star)]} \cup \underbrace{(\cancel{\partial I}_{\star} \times \partial I)}_{\substack{(\star,*)\\ (\star,\star)}}}$$



$$\Sigma S^0 = S^1 \cong \partial I^2$$

$$\{ *, (\star \times \partial I \mid \sim) \}$$

<u>Prop:</u> $J_{-1} := S^0 \cong \partial I$

cumul.

$S_0 : J_0 \cong S^0 \times I$

$S_1 : J_1 \cong S^1 \times I$

$S_2 : J_2 \cong S^2 \times I$

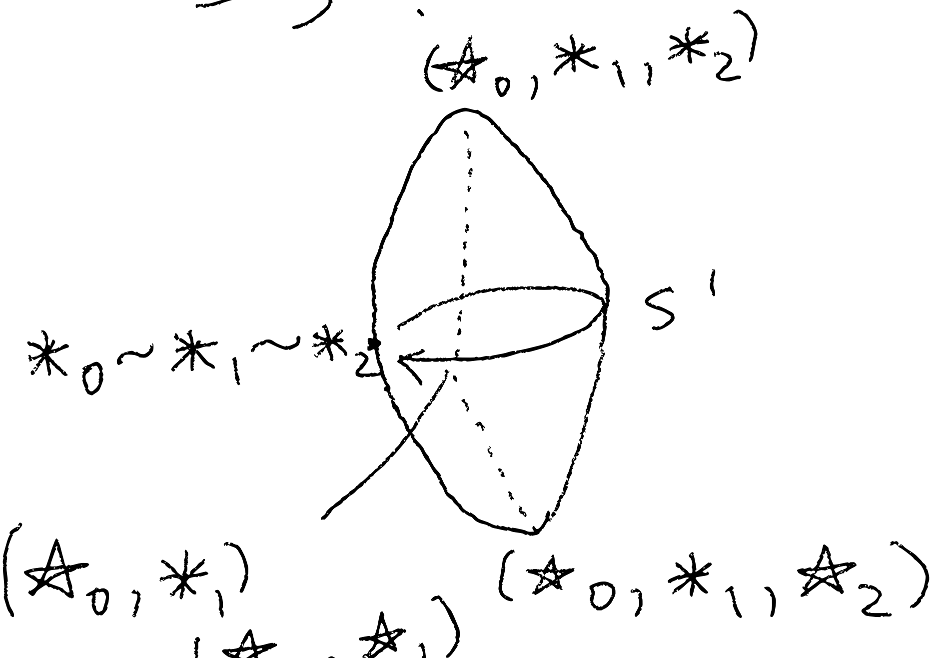
$$S^2 \cong \partial I^3 := \begin{array}{l} \mid *_2 \sim *_1 \\ \mid \partial I^2 \times (\star_2, *_2) \\ \mid \star_2 \sim *_2 \end{array}$$

$$\Sigma S^1 = \Sigma^2 \partial I$$

$$= \partial I \wedge S^2$$

$$= S^0 \wedge S^2$$

$$= S^2$$



Hence, $\forall \ \underline{n \geqslant 1}$

$$S^n = \mid \partial I^n \times (*_n, \star_n)$$
$$\mid *_n = *_{n-1}$$
$$\mid *_n = \star_n$$

$$S^1 = \mid (*_0, \star_0) \times (*_1, \star_1)$$
$$\mid *_1 = *_0$$
$$\mid *_1 = \star_1$$

$$\cong \mid 0$$
$$\mid 1$$
$$\mid 1 = 1.$$

$$I = \mid 0$$
$$\mid 1$$
$$\mid 0 = 1.$$

$$
\begin{aligned}
J_1 = \ & |\ 0 \\
& |\ 1 \times I \\
& |\ 1 = 1.
\end{aligned}
$$

$$J_0 = S_0 \times I$$

$$J_{-1} = \{*, \star\} = \partial I$$

All n-types for $n \geq 0$ are HITS.

Quotienting:

$$\frac{J_n}{J_m} \simeq J_{n-m}$$

Not every type is an n-type — we need to formalize type formers, mainly

$\underbrace{\Sigma \text{ and } \Pi}_{\text{both pick out inhabitants from an } I}$.