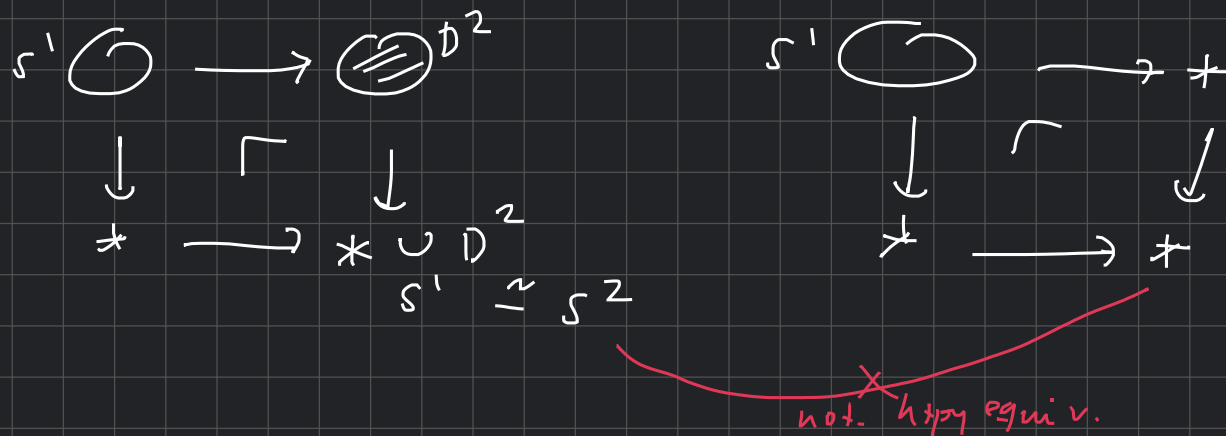


10/12 Twoples

homotopy limits

motivation: want htpy equiv. p.o.'s to be the same.



• $| - | : \text{sSet} \rightarrow \text{Top}$

is htpy invariant.

$$\left(X \underset{\text{h.e.}}{\sim} Y \right) \Rightarrow \left(|X| \underset{\text{h.e.}}{\sim} |Y| \right)$$

Q: "weak natural equivalence"?

↑ "Reedy model structure"



$n \in \text{Hom}(Lor, \sigma)$
 $\text{Fun}(C, N)$

Q: What are weak equiv's in this cat?

Strict vs. weak n-categories.

strict n-cats usually easy to describe:

n-cat: a cat enriched over (n-1)-cat.

↳ can use to describe ∞ -cats (ω -cats)

$$\omega\text{-cat} = \text{Lim} (\dots \rightarrow 3\text{-cat} \xrightarrow{u} 2\text{-cat} \xrightarrow{u} 1\text{-cat} \xrightarrow{u} \text{Set})$$

Q: translate btwn ω -cats & ~~∞ -cats~~ quasi-cats?

Another way to define ω -cats is by globular sets...

Weak n-cats? ~~very~~ hard to describe.

↳ instead of equalities for (associativity), you witness them by higher morphisms.

Q: is this where operads show up?

Projects: - ∞ -cats?

- ~~n -cats?~~

• 2-cats?

• one-object versions of n-cats

describe monoidal structures.

homotopy theory of 2-cats?

(bi-)equiv. of strict & weak 2-cats.
bi-categories

Survey of defns of n-cats - Leinster

Q: Is "bi-equiv" a sort of weak equivalence of 2-cats / bi-cats?