Problems

Wednesday, March 6, 2019 11:51 AM

1) Chain rule states that the map $\partial_* F \circ_{\partial_* Id} \partial_* G \longrightarrow \partial_*(F \circ G)$

Let ∂_* land in spectra; it is lax monoidal.

<u>Fact</u> ∂_n takes fiber sequences of functors to fiber sequences of spectra.

let $F = Hom(X, -)$, G a reduced finitary analytic functor.

(a) Reduce chain rule for such F to the case of $Hom(\vee S^i, -)$

(b) Reduce $Hom(\vee S^{i+1}, -)$ to $Hom(\vee S^i, -)$

(c) Prove chain rule for $F = Hom(\vee S^0, -)$ (harder)

(d) Suppose F satisfies

$$F(X) \cong \operatorname{Colim}_{Y \in Top} F(Y) \wedge Hom(X, Y) \quad (*)$$

Prove chain rule for f.

<u>Fact</u> We can extend the chain rule for such functors to all functors by cofibrant replacement: cofibrant functors satisfy $(*)$

2) Let $f_m(X) = \overbrace{X \wedge X \wedge \cdots \wedge X}^{m \text{ times}}$

(a) Compute $\partial_* f_m$

(b) Compute $(\partial_* f_m) \circ (\partial_* f_n)$

(c) Show the chain rule holds for $f = f_m$, $G = f_n$, $f \circ G = f_{mn}$