

REVISIONS FOR PAPER “MULTIPLICATIVE STRUCTURE IN THE STABLE SPLITTING OF $\Omega SL_n(\mathbb{C})$ ”

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We have made revisions according to the remarks that you provided for us. Please see the following list which indicates our changes in response to these remarks.

0.1. Stylistic remarks.

- (1) Clarified that $\mathbb{E}_1 = \mathbb{A}_\infty$ and we were applying the theorem in the case $n = 1$.
- (2) Replaced G by G_V to make explicit the dependence on V .
- (3) Reworded to remove the ambiguous phrase “discrete category” and moved to the notations and conventions section (cf. next revision).
- (4) Expanded the notations section to include some conventions.
- (5) Rewrote the example to clarify what we are using; added citation for the fact that $\Omega^n \Sigma^n$ is the free \mathbb{E}_n -algebra in pointed spaces and included a proof and citation of the fact that its suspension is the free \mathbb{E}_n -algebra in spectra.
- (6) Made the statement a remark and clarified the grading on A . We’ve placed the remark slightly later than suggested because one needs to set up the monoidal structure in order to make sense of the remark.
- (7)
- (8)
- (9)
- (10) We believe the statement is as intended; we include the disclaimer because the proofs there are only given in the real case.
- (11) We have moved the proof to the appendix as you have suggested.

0.2. Mathematical remarks. The diagram that you draw does indeed commute. It arises from going around the following diagram of *graded* spectra:

$$\begin{array}{ccc}
 & & F_{\mathbb{E}_2}(gr(\Sigma_+^\infty\{F_{n,k}\})) \\
 & \nearrow^{F_{\mathbb{E}_2}(\beta)} & \downarrow \epsilon \\
 F_{\mathbb{E}_2}(\Sigma^\infty S^2[1]) & \longrightarrow & gr(\Sigma_+^\infty\{F_{n,k}\}) \\
 \downarrow \pi_S & & \downarrow \pi_1 \\
 \Sigma^\infty S^2[1] & \xrightarrow{\beta} & F_{n,1}.
 \end{array}$$

The top triangle commuting is the definition of the extension of $\beta : \Sigma^\infty S^2[1] \rightarrow gr(\Sigma_+^\infty\{F_{n,k}\})$ to the free algebra $F_{\mathbb{E}_2}(\Sigma^\infty S^2[1])$. The bottom square commutes because both vertical maps are

projections of a graded spectrum onto the degree 1 piece. We have reworded and expanded the writing here to try to clarify what we are doing.

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