GSTS Exercises - Orthogonal Calculus

4/4/2019

1. Prove $\Theta BO(-)^3 \simeq \Omega^2 \mathbf{mo}(3)$ where $\mathbf{mo}(3)$ is the $\mathbb{Z}/3$ - Moore spectrum.
2. Show $\Theta BTop(-)^{-1} \simeq \mathbf{A}(*)$ where $\mathbf{A}(*)$ is Waldhausen's A-theory of a point.
3. Show $(\Theta S^{(-)})^{(n)} \simeq O(n)_+ \wedge_{\Sigma_n} \partial_n(Id_{Top_*})$.
4. Define $\sigma^{(ad)} : E^{(2)}(V) \to \Sigma^2 E^{(2)}(\mathbb{R} \oplus V)$.
5. Show that $E^{(2)}(V) \to E(V) \to \underset{0 \neq U \subset \mathbb{R}^{n+1}}{\underleftarrow{\text{holim}}} E(U \oplus V))$ is a fiber sequence.
6. If E is polynomial of degree 2, show that it takes

   $$\begin{array}{ccc} V_0 & \longrightarrow & V_1 \\ \downarrow & & \downarrow \\ V_2 & \longrightarrow & V_1 \end{array}$$

   to a pullback diagram (???)
7. Show that $BO(V) \to \underset{0 \neq U \subset \mathbb{R}^{n+1}}{\underleftarrow{\text{holim}}} E(U \oplus V))$ is an equivalence.
8. Sketch construction of $T_n E$.
9. Think about the $O(n)$ - action on $\Theta E^{(n)}$.
10. Given a computational example of the $O(n)$ - action on $\Theta E^{(n)}$.