Recall def of orthogonal spectra.
Define the category $\mathcal{C}$ and its Bredon model structure.
Generating set $\mathcal{L} = \{ G^n_+ \rightarrow \Sigma G^n_+ \} : n \geq 0, \mathbb{H} \in G_+$

Change of group adjunction

It is a Quillen adjunction, i.e. left adjoint preserves (trivial) cofibrations right fibrations.

Define the monoidal category $F_\mathbb{H}$, enriched over $\mathcal{C}$ and is an SMC.

$$F_\mathbb{H}(U, V, W) \rightarrow F_\mathbb{H}(U, V) \times F_\mathbb{H}(V, W) \rightarrow F_\mathbb{H}(U, W)$$
is a $G$-map.
\[ \mathfrak{p} = [g, \delta] \quad B \]

(Def \( \mathfrak{p} C = [g, \partial C] \) \( \mathfrak{g} \)-module with \( \mathfrak{g} \)-maps and \( \mathfrak{p} \mathfrak{c} \) = [\( \mathfrak{d} \), \( \mathfrak{j} \)] \( \mathfrak{g} \)-algebra with cont. maps)

Morphism objects (in \( \mathfrak{g} \mathfrak{c} \)) are ends

\[ X \mathfrak{c} (X, Y) = \int \mathcal{C} (X, Y) \text{ in } \mathfrak{c} \]

\[ X \mathfrak{c} (X, Y) = \int \mathcal{C} (X, Y) \text{ in } \mathfrak{c} \]

Define Quillen ring, lemma and extension.

Geneda spectra \( s^{-1} \)

Tentological presentation

\[ X \cong \int \mathfrak{c} \mathfrak{g} \left( s^{-1} X \right) \]

 Smash product

\[ X \wedge Y = \int \mathfrak{c} \mathfrak{c} \left( s^{-1} \mathfrak{d} \right) \wedge \mathfrak{e} \mathfrak{g} \]

\[ (X \wedge Y)_W = \int \mathfrak{c} \mathfrak{c} \left( s^{-1} \mathfrak{d} \right) \wedge \left( s^{-1} \mathfrak{d} \right) \wedge X \mathfrak{c} \wedge Y \]
Smashing with a spectrum $X$ with $\mathcal{E} X$ (tenor) is the same as smashing (Does come) with the suspension spectrum $S^0 \mathcal{E} X$, which is defined by $(S^0 \mathcal{E} X)_V = S^V \mathcal{E} X$ for all $V$.

Closed 3MC structure in $\mathcal{A}_\mathcal{E}$.
$\mathcal{A}_\mathcal{E}$ has an internal hom $\mathcal{F}_\mathcal{E}(\cdot, \cdot)$ with

$$\mathcal{A}_\mathcal{E}(X, Y, Z) = \mathcal{F}_\mathcal{E}(X, \mathcal{F}_\mathcal{E}(Y, Z))$$

The monoid $\mathcal{E}$ spectrum $\mathcal{F}_\mathcal{E}(Y, Z)$ is given by

$$\mathcal{F}_\mathcal{E}(Y, Z)_V = \mathcal{A}_\mathcal{E}(S^V \mathcal{E} Y, Z)$$

In fact

$$\mathcal{F}_\mathcal{E}(S^0 \mathcal{E} X) = X$$

$$\mathcal{F}_\mathcal{E}(S^{-V} \mathcal{E} X, \cdot X)_V = \mathcal{F}_\mathcal{E}(\cdot X)$$
What are ends and coends?

Given a functor
\[ \psi : X \times Y \to C \]
where \( X \) is small, for each morphism \( x \to y \) in \( X \), we have a diagram in \( C \):
\[
\begin{array}{c}
\xymatrix{ H(x, x) \
\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \\
H(y, y) & H(x, y) & H(y, y) & H(x, x) \\
\phi_x & \phi_y & \phi_{x \to y} & \phi_{y \to x} \}
\end{array}
\]

Assume \( C \) is cocomplete and consider
\[
\begin{array}{c}
\xymatrix{ H(X, Y) \
\downarrow \quad \downarrow \\
\bigoplus \ar[r] & H(Y, Y) \\
\phi_x & \phi_y \\
\ar[r] & \phi_{\sum \phi} \\
\ar[r] & \phi_{\prod \phi} \}
\end{array}
\]

The coend \( \int \phi \) is the coequalizer of \( \phi \).

For \( C \) complete, we have
\[
\begin{array}{c}
\xymatrix{ \int H(x, y) \
\downarrow \quad \downarrow \\
\prod H(x, y) \\
\phi_x \ar[r] & \phi_{\prod \phi} \\
\ar[r] & \phi_{\sum \phi} \}
\end{array}
\]
We will define 8 different model structures on $M^g$, starting with the projective one, to be defined below. It can be modified in any combination of 3 different ways: postwarped, stabilized, and enlarged.

We need all 3 to prove the KT theorem.

Define projective structure on $M^g$ (page 6 of 10/15 note).

Then discuss its CG structure.

Outline the 3 modifications.