BRENDA JOHNSON, Union College

Models for Taylor Polynomials of Functors

Let $\mathcal{C}$ and $\mathcal{D}$ be simplicial model categories. Let $f : A \to B$ be a fixed morphism in $\mathcal{C}$ and $\mathcal{C}_f$ be the category whose objects are pairs of morphisms $A \to X \to B$ in $\mathcal{C}$ that factor f. Using a generalization of Eilenberg and Mac Lane's notion of cross effect functors (originally defined for functors of abelian categories) to functors from $\mathcal{C}_f$ to $\mathcal{D}$, we produce a tower of functors, $\cdots \to \Gamma_n^f F \to \Gamma_{n-1}^f F \to \cdots \to \Gamma_0^f F$, that acts like a Taylor series for the functor F. We compare this to the Taylor tower for F produced by Tom Goodwillie's calculus of homotopy functors, and use it to better understand the roles of the initial and final objects, A and B, in the calculus of homotopy functors. This is joint work with Kristine Bauer, Rosona Eldred, and Randy McCarthy.