Calculations of Higher Topological Hochschild Homology.

For $R$ a commutative ring, $M$ an $R$-module, and $X$, a pointed simplicial set, J.-L. Loday defined a simplicial $R$-module $\mathcal{L}_X(R; M)$ which in each simplicial degree $n$ consists of a tensor product, indexed by all the $n$-simplices in $X_n$, of copies of $R$, except that over the base point one has a copy of $M$. The homology groups of $\mathcal{L}_X(R; M)$ with respect to $d = \sum_{i=0}^{n} (-1)^i d_i$ are homotopy invariants of $|X|$. Taking $X$, to be the minimal model of $S^1$, one recovers the standard Hochschild complex for $R$ with coefficients in $M$. Using $X = S^n$ instead, one gets higher Hochschild homology groups. One can do the same thing when $R$ is a commutative ring spectrum and $M$ an $R$-module to get the higher topological Hochschild homology groups. If $R$ and $M$ are Eilenberg-Mac Lane spectra, taking the sphere spectrum as the ground ring spectrum gives a finer invariant than using an Eilenberg-Mac Lane spectrum, which recovers the algebraic case. I will discuss basic higher Hochschild homology calculations, our calculation of $\text{THH}^{[n]}(\mathbb{Z}; \mathbb{F}_p)$, as well as a calculation of $\text{THH}^{[n]}(\mathbb{F}_p)$. (Received August 06, 2015)