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Categorified Chern character and Hopf-cyclic cohomology

For a Hopf algebra H, motivated by some results in derived algebraic geometry, we propose a generalization of stable anti-Yetter-Drinfeld contramodules as an analogue of S^1-equivariant quasi-coherent sheaves on the derived loop space of X. This category serves both as the target for categorified Chern characters of H-module algebras and also as the source of coefficients for cohomology. The Hopf-cyclic cohomology is then recovered as an Ext in this category as was done by Connes and Kassel for cyclic cohomology using cyclic objects and mixed complexes respectively. This places Hopf-cyclic cohomology into the same framework as de Rham cohomology.