

# Syzygies of the cotangent complex

Benjamin Briggs

The cotangent complex is an important but usually difficult to compute object associated to a map of commutative rings (or schemes). It is connected with some more tractable invariants: the module of differential forms, the conormal module, and Koszul homology can all be seen as syzygies of the cotangent complex. In general, these syzygies are known as the higher cotangent modules. One can try to establish higher analogues of the Jacobian criterion by characterising geometric conditions in terms of homological properties of the higher cotangent modules. I will show how thinking along these lines leads to a new proof of Quillen's conjecture on the cotangent complex (Avramov's Theorem) and simultaneously to a proof of Vasconcelos' conjecture on the conormal module. The key tool is a map from André-Quillen cohomology to Hochschild cohomology, defined using the universal Atiyah class. This is all joint work with Srikanth Iyengar.