Algebra/Topology Seminar

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Betti Categories of Graded Modules

Thursday, October 17, 2013
1:15 p.m. in ES-143

Abstract. Graded modules over graded rings arise naturally in the study of projective algebraic varieties. In this work in progress, joint with Marco Varisco, we associate to each such module M a small category $\mathcal{B}(M)$, called the *Betti category* of M, which captures the essence of the homological properties of M. For modules of classical interest such as monomial or toric ideals, or the maximal ideal of a toric ring, we show that the isomorphism class of the Betti category $\mathcal{B}(M)$ determines the structure of the minimal resolution of M. More precisely, if M' and M'' are graded modules within those classes (over graded rings R' and R'', respectively) and have isomorphic Betti categories, then the minimal free resolution of M'' over R'' can be obtained by applying a canonical functor to the minimal free resolution of M' over R'.