Bernoullis Tafelrunde

Graduate Student Seminar

Thursday, 5 October 2017, 13:15-14:00
Seminarraum 05.002, Spiegelgasse 5

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Matrix Factorizations and Chern classes for modules with (eventually) periodic resolutions

Abstract

There is already a theory for Chern classes for projective modules over rings (this is by the Serre-Swan theorem the same as chern classes for vector bundles). These classes live in the de Rham cohomology of the corresponding ring. We try to generalize this concept for modules with (eventually) periodic resolutions. We want to do this in a way such that most properties from the theory for projective modules remain true.

Matrix Factorizations were introduced by Eisenbud in 1980 to understand minimal free resolutions of finitely generated modules over hypersurface rings (i.e. quotients of regular local rings by one nonzero, nonunit element). In fact it turns out that all minimal free resolutions over such rings are eventually periodic of length 2 and this period is given by a matrix factorization. So matrix factorizations are the prototypical example for periodic resolutions and not many other examples are known.