

Algebraic K-Theory Seminar

The total rank and toral rank conjectures

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Abstract: Let R be local ring of dimension d and F a complex of free R -modules whose homology modules are of finite length. It has been conjectured that the sum of the ranks of the free modules occurring in F (i.e., the total rank of F) must be at least $2^{\hat{d}}$. When F is the minimal resolution of a module of finite length, this conjecture is a weak form of the well-known Buchsbaum-Eisenbud-Horrocks Conjecture. Assume X is a compact CW complex that admits a free action by a d -dimensional torus. The Toral Rank Conjecture, due to Halperin, predicts that the sum of the ranks of the rational homology groups of X must be at least $2^{\hat{d}}$. There is a variant of this conjecture, due to Carlsson, concerning spaces that admit a free action by an elementary abelian p -group. In this talk I will discuss the relationship between these conjectures and recent progress toward settling them.

Wednesday, September 13 at 10:30 AM in SEO 1227