

RESOLUTIONS OF SEMIGROUP RINGS

Hema Srinivasan

University of Missouri (Columbia, United States)

Given a set A of positive integers a_1, \dots, a_n minimally defining a semigroup $\langle A \rangle$, the semigroup ring defined by A is $R(A) = k[t^{a_1}, t^{a_2}, \dots, t^{a_n}]$ which is isomorphic to $k[x_1, \dots, x_n]/I_A$. The defining ideal I_A and various invariants of the associated semigroup rings have been studied for a long time. The ideal I_A is a binomial prime ideal of height $n - 1$. When $n = 3$, this defining ideal is determinantal, the ideal of 2×2 minors of a 2×3 matrix. For higher dimensions, structure of the ideal or the minimal resolution is known if either the sequence A is special, for instance an arithmetic sequence or when the embedding dimension n is small. We will discuss the problem of finding the graded minimal free resolutions and other invariants such as the type, Hilbert functions and Betti numbers. Specifically, we will explicitly construct the minimal resolutions for semigroup rings obtained by gluing and derive formulas for all the invariants that can be obtained from the numerical information from the resolution.

This is joint work with Philippe Gimenez