

Queen's Algebraic Geometry — Seminar —

THE SEMINORMALITY AND COHEN-MACAULAY PROPERTY OF AFFINE SEMIGROUP RINGS

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Abstract

In the early 1970s, Hochster proved that normal semigroup rings generated by monomials are Cohen-Macaulay. When we weaken normal to seminormal, naturally, a question is raised.

Question: When is a seminormal affine semigroup ring Cohen-Macaulay?

Conversely, when is a Cohen-Macaulay affine semigroup ring seminormal?

However, this question is not easily answered because for affine semigroup rings, many examples show that Cohen-Macaulay and seminormal may not coincide. For example, $k[t^2, t^3]$ is Cohen-Macaulay but not seminormal; conversely, $k[x, y, z^2, xz, yz]$ is seminormal but not Cohen-Macaulay.

In this talk, I will explore the coincidence between the Cohen-Macaulay property and seminormality of arbitrary affine semigroup rings, and demonstrate that under certain circumstances, an affine semigroup ring is seminormal if it is Cohen-Macaulay. Furthermore, a conjecture is given for a seminormal affine semigroup ring $k[S]$ to be Cohen-Macaulay, and is proved when $\text{rank}(S) \leq 3$.

Monday, January 31, 2004
2:30pm – 3:30pm
422 Jeffery Hall