

# A class of Noetherian finitely presented algebras

## Abstract

The search for new concrete classes of finitely presented algebras (defined by monomial relations) that satisfy some arithmetical properties (such as being a maximal order) recently gained a lot of interest. These algebras can be considered as semigroup algebras  $K[S]$ . In general, it remains unsolved problems to characterize when an arbitrary semigroup algebra  $K[S]$  is Noetherian and when it is a prime Noetherian maximal order. The former question has been resolved when  $S$  is submonoid of polycyclic-by-finite groups. The second question has been completely solved when  $S$  is an abelian monoid (Chouinard) and when  $S$  is a polycyclic-by-finite groups (Brown).

In this lecture we report on recent results (joint with Goffa and Okninski) that give an answer to the question when  $K[S]$  is a prime Noetherian maximal order in case  $S$  is a submonoid of a polycyclic-by-finite group. In order to obtain a characterization, we first investigate height one prime ideals of  $K[S]$ . It turns out that actions of  $S$  on the height one primes are crucial. Several applications are given. We finish with some examples illustrating the results. Also some related results will be presented.