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MONOMIAL IDEALS OF GRAPHS AND THEIR SYZYGIES

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Abstract

Given a homogeneous ideal I in a polynomial ring $R = k[x_1, \dots, x_n]$, we can describe the structure of I by using its minimal free resolution. All the information related to the minimal free resolution of I is encoded in its Betti numbers. However, it is a difficult problem to express Betti numbers of any homogeneous ideal in a general way. Due to this difficulty, it is common to focus on coarser invariants of I or particular classes of ideals. In this talk, we consider monomial ideals associated to graphs. We will discuss the Castelnuovo-Mumford regularity, projective dimension, and extremal Betti numbers of such ideals and provide formulas for these invariants in terms of the combinatorial data of their associated graphs. Results presented in this talk are from joint works with Biermann, O'Keefe, Lin, and Casiday.

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