

Subadditivity of Maximal Degrees of Betti Numbers

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These two talks will be about the subadditivity of syzygies of monomial ideals. More precisely, for a homogeneous ideal in a polynomial ring, if $b_{i,j}$ denotes the j -graded betti numbers in homological degree i , and t_i denotes the maximum j for which $b_{i,j} \neq 0$, then the subadditivity property, if true, states that $t_i \leq t_a + t_b$ for any positive integers a and b such that $i = a + b$.

This property is known to fail for general homogeneous ideals, but for monomial ideals it is not known. Moreover, for monomial ideals the subadditivity property translates to various splittings of simplicial homology.

In these two talks, we will review the literature, and some background on topological structures supporting resolutions. Then we will consider each topological structure and apply it to special classes of monomial ideals to extract the subadditivity property.