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Controlling Homology in Virtual Resolutions of Monomial Ideals

Virtual Resolutions are certain complexes of free modules over the Cox ring of a toric variety. These complexes are exactly those that sheafify to a free resolution of sheaves. However, a virtual resolution may have homology in higher homological degrees. In recent work, I describe a construction of labeled cell complexes describing virtual resolutions with higher homology and how a simple subdivision operation on the cell complex can often yield a virtual resolution of the same module without higher homology.