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Using lex-plus-powers ideals to maximize global Betti numbers

We investigate the global Betti numbers of homogeneous ideals in a polynomial ring that contain a monomial complete intersection. Given a fixed monomial complete intersection in a polynomial ring we determine the maximum first and last Betti numbers for homogeneous ideals that contain the complete intersection. In the case of a polynomial ring in three variables we also determine the maximum second Betti number. In this setting, we know from a result of Mermin-Murai that the global Betti numbers will be maximized by a lex-plus-powers ideal. The results also make use of the structure of the Hilbert function of a complete intersection as well as the concept of e-monomials.