F U ¨ B
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H 4.

M 18, 2007

D M 24, 2007

E 1.

The ideal $I = \langle x, y, z \rangle^3$ is not strongly generic. Construct a free resolution (* three different free resolutions) of I by deformation of the exponents.

E 2.

Use your free resolution of the previous exercise to compute the Betti numbers.

E 3.

Let P be a simple polytope with facets $F_1, \ldots, F_n$. Label every face F of P by the product of those x_i for which $F \not\subseteq F_i$.

Show that this labeled cell complex supports a minimal free resolution of the ideal generated by the vertex labels.

E 4.

Use the (result of the) previous exercise to compute the K-polynomial of the ideal arising from the 3-dimensional cube.