

COMPUTATIONAL ALGEBRAIC GEOMETRY II

MATS BOIJ

HOMEWORK 2

Associated graded algebra. As we saw in the example with the computation of the multiplicity of the ideal $I = (x^5 + y^3 + z^3, x^3 + y^5 + z^3, x^3 + y^3 + z^5) \subseteq S = \mathbb{Q}[x, y, z]$, we can define the associated graded algebra with respect to the maximal ideal $\mathfrak{m} = (x, y, z)$.

Write a program that computes the presentation of the associated graded algebra with respect to a maximal ideal given an artinian ideal I . In particular, compute the presentation of the associated graded algebra of $(S/I)_{(x,y,z)}$.

Orbits of nilpotent matrices. For the group working on orbits of nilpotent matrices. Look at the orbit of the other nilpotent matrices. What are the equations cutting out the closure of the orbit of N_2 ?

Blow-ups. For the group working on blow-ups. Consider the blow-up of six points in \mathbb{P}^2 and find embed the resulting surface in \mathbb{P}^3 as a cubic surface.

Deadline. The homework should be handed in at the next meeting, February 10.