MATH 5399-001 HOMEWORK DUE 5 MAR

Before Midnight on 5 March send me a Macaulay 2 file (extension m2) with the commands to solve the following problems. Please make `restart` the first command in your file.

In the ring $R = k[x, y, z, w]$ consider the ideal $I = \langle xy^2 - xyz + w^3 \rangle$

(1) Compute the Hilbert polynomial of R/I as a polynomial in the variable i.

(2) Let L and M hyperplanes in $\mathbb{P}^3_k$. Verify that the varieties $V(I) \cap L$ and $V(I) \cap L \cap M$ have the "right" dimensions and degree.