

Algebraic geometry : HW 4

1* (bonus problem). Let S_d denote the polynomials in $k[x_0, \dots, x_n]$ that are k -linear combinations of monomials of degree d . Prove that an ideal \mathfrak{a} of $k[x_0, \dots, x_n]$ is homogeneous (i.e., generated by homogeneous polynomials) if and only if $\mathfrak{a} = \sum_d \mathfrak{a} \cap S_d$.