

Intersection Theory

Sheet 6

will be discussed on July 4

Exercise 1. Compute the number of lines on a general hypersurface $X \subset \mathbb{P}^4$ of degree 5.

Exercise 2. Let $\ell_1, \dots, \ell_8 \subset \mathbb{P}^3$ be 8 general lines. Compute the number of conics $C \subset \mathbb{P}^3$ intersecting ℓ_1, \dots, ℓ_8 .

Exercise 3. Let $f: Y' \rightarrow Y$ be a flat morphism of varieties and let $X \subset Y$ be a subvariety. Let $X' = f^{-1}(X)$ and consider the induced morphism $g: X' \rightarrow X$. Show that $g^*s(X, Y) = s(X', Y')$.

Exercise 4. Let \tilde{Y} be the blow-up of a variety Y along a subvariety $X \subset Y$. Let $E = \mathbb{P}(C_X Y) \subset \tilde{Y}$ be the exceptional divisor. Show that $N_E \tilde{Y} = \mathcal{O}_E(-1)$.

Exercise 5. Let $X = \{x_0^2 = x_1 x_2\} \subset \mathbb{P}^3$ and $\ell = \{x_0 = x_1 = 0\} \subset X$. Compute the Segre class $s(\ell, X) \in \text{CH}_0(\ell) \oplus \text{CH}_1(\ell)$.