1. Exercises

In the exercises below assume everything is defined over the complex numbers. The following exercises are about the Hilbert scheme of conics in $\mathbb{P}^n$.

Exercise 1.1. Calculate the number of conics in $\mathbb{P}^3$ that intersect $8-2i$ lines and contain i points for $0 \leq i \leq 3$.

Exercise 1.2. Generalize our discussion in class to the Hilbert scheme of conics in $\mathbb{P}^n$. Find a model of the Hilbert scheme as a $\mathbb{P}^5$-bundle over the Grassmannian $\mathbb{G}(2,n)$. Work out the cohomology ring for small n.

Exercise 1.3. Find the class of an irreducible component of the space of conics on an anti-canonically embedded Del Pezzo surface D_n in $\mathbb{P}^n$.

Exercise 1.4. Calculate the numbers of conics in $\mathbb{P}^4$ that intersect general $11-2i-3j$ planes, i lines and j points.

Exercise 1.5. Calculate the class of conics in $\mathbb{P}^n$ that are tangent to a hyperplane. Find how many conics are tangent to a general plane and intersect 7 general lines in $\mathbb{P}^3$.

Exercise 1.6. Find the class of the divisor of reducible conics in $\mathbb{P}^n$