1. Exercises

In the exercises below assume everything is defined over the complex numbers.

Exercise 1.1. Let C be a smooth, connected, non-degenerate curve of genus g and degree d in $\mathbb{P}^3$. Calculate the class in $\mathbb{G}(1,3)$ of the variety of tangent lines to C.

Exercise 1.2. Suppose S is a smooth surface of degree d in $\mathbb{P}^3$. Calculate the class in $\mathbb{G}(1,3)$ of the variety of tangent lines to S.

Exercise 1.3. Find the class of lines in $\mathbb{G}(1,3)$ contained in some member of a general pencil of quadric hypersurfaces in $\mathbb{P}^3$.

Exercise 1.4. Find the class in $\mathbb{G}(2,5)$ of the variety of $\mathbb{P}^2$s contained in a smooth quadric hypersurface in $\mathbb{P}^5$.

Exercise 1.5. Determine the cohomology rings of small Grassmannians such as $\mathbb{G}(1,3), \mathbb{G}(1,4), \mathbb{G}(1,5), \mathbb{G}(2,4), \mathbb{G}(2,5)$ until you feel comfortable with Schubert calculus.

Exercise 1.6. Calculate $\sigma_{3,2,1} \cdot \sigma_{4,1,1}$ in $\mathbb{G}(3,8)$ first by using the Giambelli and Pieri formulae, then using the Littlewood - Richardson rule.