Exercise Sheet 9

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Exercises with numbers in brackets are taken from the book "An invitation to algebraic geometry" by Smith et. al. (2000).

Exercise 1 [5.5.2]. Find an example of two plane projective curves that are isomorphic but have different degrees.

Exercise 2 [5.5.3]. Find an example of two plane projective curves that have the same degree but are not isomorphic.

Exercise 3 [5.6.1]. Assume that the variety $V \subset \mathbb{P}^n$ has the Hilbert polynomial P. Calculate the Hilbert polynomial of the image variety $\nu_d(V) \subset \mathbb{P}^{\binom{n+d}{d}-1}$ under the degree-d Veronese map.

Exercise 4. Suppose $V = \{p_1, p_2, p_3\} \subset \mathbb{P}^2$ consists of three points. Compute the Hilbert function of V.