

Algebraic Curves

Section B course Hilary 2021

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Example sheet 0 (not for handing in)

1. Let $(2, 1), (1, 1), (3, 4)$ represent points in the projective line \mathbb{RP}^1 . Find representative vectors v_1, v_2, v_3 for these points which satisfy $v_1 + v_2 + v_3 = 0$
2. Let $T : V \rightarrow V$ be an invertible linear map. When is $[v] \in \mathbb{P}(V)$ a fixed point of the projective transformation τ defined by T ? Show that every projective transformation of \mathbb{RP}^2 has a fixed point. Give an example of a projective transformation of \mathbb{RP}^3 with no fixed points.
3. Describe the projective transformations of \mathbb{FP}^n that preserve the \mathbb{FP}^{n-1} at infinity given by $x_0 = 0$ (ie. which map points at infinity to (possibly different) points at infinity).