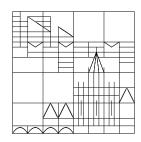
Universität Konstanz Fachbereich Mathematik und Statistik Daniel Plaumann Summer 2015



## CLASSICAL ALGEBRAIC GEOMETRY

6th problem sheet Tutorial on 26 May 2015

- 1. Compute the proper transform of the plane curve  $\mathcal{V}(y^2 x^3) \subset \mathbb{A}^2$  in the blow-up of  $\mathbb{A}^2$  at the origin.
- 2. Assume char(K) ≠ 2 and let X ⊂ P<sup>n</sup> be a quadric hypersurface defined by a quadratic form Q ∈ K[Z<sub>0</sub>,..., Z<sub>n</sub>]<sub>2</sub>.
  Show that the singular points of X form a linear subspace. What is its dimension?
- 3. Let  $X \subset \mathbb{C}^n$  be a smooth algebraic curve over  $\mathbb{C}$ . Let  $\Delta \subset \mathbb{C}$  be an open neighbourhood of 0 and

$$\varphi: \Delta \to \mathbb{C}^n$$

a holomorphic map with  $\varphi(\Delta) \subset X$  and  $\varphi'(0) \neq 0$ .

- (1) Show that the tangent space to *X* at  $\varphi(0)$  is spanned by the vector  $\varphi'(0)$ .
- (2) Use this to compute the tangent space to the twisted cubic in  $\mathbb{P}^3$  at any point. Verify directly that the definition from the lecture gives the same result.