Exercise Sheet 9.

Algebraic geometry

27.04.2022

Let k be an algebraically closed field.

Q1 Describe $\mathrm{Bl}_p\mathbb{P}^2$ as pairs (q, l) where l is the line in $\mathbb{P}^2$ through q and p.

Q2 Let X be a topological space. Suppose that X has an open cover $\{U_i\}_{i\in I}$ where U_i are irreducible and $U_i \cap U_j \neq \emptyset$ for all $i, j \in I$. Then prove that X is irreducible.

Q3 Let $X = V(xy - w^2) \subset \mathbb{A}^3$ be an affine surface. Prove that the blowup of X at the origin $\mathrm{Bl}_0(X)$ is regular.