

**MATH IN MOSCOW. ALGEBRAIC GEOMETRY.
HOMEWORK 2**

- (1) An isomorphism $f: X \rightarrow X$ is called an *automorphism* of X . Note that the automorphisms form a group. Classify automorphisms of \mathbb{A}^1 .
- (2) Classify prime and maximal ideals in $\mathbb{Z}/n\mathbb{Z}$ and $\mathbb{C}[x]$.
- (3) Prove that $\mathbb{C}(t)$ is not finitely generated as \mathbb{C} -algebra.
- (4) Construct an example of a regular map between affine algebraic sets whose image is neither open nor closed.
- (5) Is a map $\phi: \mathbb{A}^1 \rightarrow V$ given by $x \mapsto (x^2, x^3)$, where
$$V = \{y^2 - x^3 = 0\} \subset \mathbb{A}^2,$$
a homeomorphism?