ENUMERATIVE GEOMETRY

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Contents

1. Talk 1 — The Chow ring

1.1. **Algebraic varieties.** Roughly speaking, they are mathematical objects glued from zero loci of polynomials which globally satisfy a certain Hausdorffness property. They are called *projective* if they can be embedded as a closed subset in some projective space, and *irreducible* if as a topological space they cannot be expressed as a union of two proper closed subsets.

From now on we follow [?] and assume all varieties to be irreducible unless otherwise specified.

1.2. **The Chow group.**

Definition 1.1. Let X be a variety. The *group of cycles* on X, denoted $Z(X)$, is the free abelian group generated by the set of subvarieties of X.

Example 1.2. If X is a curve, then any cycle $\xi \in Z(X)$ has the form

$$n_1 P_1 + \ldots + n_r P_r + mX,$$

where $r \in \mathbb{N}$, $n_1, \ldots, n_r, m \in \mathbb{Z}$ and $P_1, \ldots, P_r \in X$ are points.

Definition 1.3. Denote by $\mathrm{Rat}(X) \subseteq Z(X)$ the subgroup generated by differences of the form

$$\Phi \cap (\{t_0\} \times X) - \Phi \cap (\{t_1\} \times X),$$

where $t_0, t_1 \in \mathbb{P}^1$ are two points and $\Phi \subseteq \mathbb{P}^1 \times X$ is a subvariety not contained in any fibre $\{t\} \times X$.

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We say that two cycles $\xi_1, \xi_2 \in Z(X)$ are *rationally equivalent* if their difference is in $\mathrm{Rat}(X)$.

References

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