

Prym theory of Galois coverings

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The theory of complex algebraic curves deals with objects that looks like bounded real surfaces: a sphere, a tyre, a balloon shaped 8 and others but thought in a completely abstract way. One of the aims of the theory is to classify them and maps between them. Such maps are called coverings.

The theory of abelian varieties deals with generalisations of a tyre to higher dimensions, obviously in a completely abstract way. We also want to classify such objects.

The Prym theory is a way to connect and compare objects in both theories via, so called Prym map. It is believed that Prym maps is, apart from finite number of cases, generically injective. The classical Prym theory was dealing with unbranched double coverings of algebraic curves. A few years ago people started considering more difficult cases, like branched or cyclic of higher degree. The P.I. with his collaborators started considering non-cyclic cases, called Klein coverings.

The main aim of the project is to consider more new cases of Prym maps that are induced by so called Galois coverings and to show injectivity of Prym maps in these cases. To do so, we would like to establish a new research team that will improve known methods, develop new ones and show new results. Specifically, the aims of the project are:

1. $\mathbb{Z}_3 \times \mathbb{Z}_3$ coverings of genus 2 curves
2. Klein coverings of genus 3 curves and more generally of trigonal curves
3. Isotropic Klein coverings of hyperelliptic curves
4. $\mathbb{Z}_p \times \mathbb{Z}_p$ coverings of genus 2 curves for p prime
5. Non-simple abelian varieties of small dimensions

The precise definitions of above aims can be found in recent papers of P.I. of the project. We plan to collaborate internationally to achieve them.

The expected result of the project is a better understanding of both theories and a connection between them. It will be contained in a series of papers in well-established international journals and some presentations on conferences and seminars.