

MATHEMATISCHES FORSCHUNGSINSTITUT OBERWOLFACH

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Mini-Workshop: Group Actions on Curves: Reduction and Lifting

Organised by
Irene I. Bouw, Ulm
Ariane Mezard, Versailles
Stefan Wewers, Hannover

November 16th – November 22nd, 2008

ABSTRACT. Group actions on algebraic curves over local, global and finite fields play an important role in modern algebraic and arithmetic geometry. From the arithmetic perspective, the most difficult and interesting case occurs when a group with a nontrivial p -subgroup acts on a curve over a p -adic field or a finite field of characteristic p .

The goal of this workshop was to bring together a group of active and mostly young researchers working in this area, to discuss the latest developments and to stimulate further research.

Mathematics Subject Classification (2000): 11G20, 14D15, 14H30, 14L30.

Introduction by the Organisers

The mini-workshop *Group actions on curves: reduction and lifting*, organized by Irene I. Bouw (Ulm), Ariane Mézard (Versailles) and Stefan Wewers (Hannover) was held November 16th – November 22nd, 2008. There were 15 participants, 6 of whom were PhD-students or recent PhDs. There were 15 talks and 2 discussion sessions. There was a joint evening session with the mini-workshop *Symmetric Varieties and Involutions of Algebraic Groups*.

The talks discussed very recent progress on the following closely related topics:

- stable reduction of covers of curves,
- the local lifting problem, Oort's conjecture,
- reduction of group scheme actions and torsors, differential data,
- curves with many automorphisms,
- versal deformation rings.

The theme of the first discussion session was the local lifting problem. Several participants gave an informal presentation of possible approaches for solving it.

Afterwards, we discussed how the different approaches fit together. The main emphasis was the connection between differential data and torsors under group schemes.

The theme of the second discussion session was the structure of deformation spaces. We discussed several questions that came out of the talks. Among other things, given a family of lifts of a cover of formal germs of curves from positive characteristic to characteristic zero, is there a reasonable notion of ‘moduli’ of such lifts, and how does it relate to the position of the branch points? We formulated several conjectural statements and discussed their relevance and possible proofs.