STRUCTURES ON BIRATIONAL AUTOMORPHISM GROUPS
MOSCOW, 14–18 NOVEMBER 2016
ABSTRACTS

Artem Avilov (Higher School of Economics)
Automorphisms of three-dimensional varieties and the Cremona group

In this talk I will explain how the notion of birational rigidity helps us to find new finite subgroups of the Cremona group. I will classify all (possibly) birationally rigid G-varieties among some interesting class of Fano varieties. Such varieties give us special subgroups of the Cremona group if rank 3.

Jeremy Blanc (University of Basel)
Dynamics of birational maps of surfaces

An introduction to birational maps of surfaces and their iterations will be given. In particular, we will see the relation between iterations of the birational maps and fibrations invariant, and also what kind of expentional growth we can find (description of the set of dynamical degrees).

In the first lecture, I will describe a few birational maps of the projective plane and show the type of degree growth one obtain (degree of the iterates). Some of them are bounded, some grow linearly, quadratically and exponentially. Then we will recall the result that explains why theses are the only possible types. In the second lecture, I will introduce the Picard–Manin space obtained using blow-ups of all possible points of the plane, including infinitely near, and show the relation between the types of growth and the action on the Picard–Manin space (elliptic, parabolic or loxodromic). In the third lecture, we will see the definition of dynamical degree of a birational map of a surface and observe that this one is a Pisot number or a Salem number. Then observe the relation with the conjugation to automorphisms and the gaps one can find in the dynamical spectrum of a rational surface. The aim of the last lecture is to explain why the set of dynamical degrees of all birational transformations of the plane is well-ordered and closed.

Julie Déserti (IMJ-PRG)
Algebraic and dynamical properties of the Cremona group

I will introduce the basic tools which are useful to study such maps by presenting some known properties of the Cremona group. The mentioned properties are algebraic properties: generators, relations, finite subgroups, subgroups of finite type, automorphisms of the

Cremona group, Tits alternative... but also if possible dynamical properties: classification of birational maps, centralizers of Cremona maps, dynamics of a Heisenberg subgroup and of course construction of automorphisms with positive entropy.

Adrien Dubouloz (Université de Bourgogne)
Endomorphisms of open surfaces

After a review of basic facts on the classification theory of non complete algebraic surfaces, with a particular focus on affine ones, we will turn to the study of their groups of algebraic automorphisms in terms of the birational geometry of their projective models. I will in particular survey a collection of existing general tools and principles of log birational geometry which allow to partially understand the structure of certain huge, infinite dimensional, groups of automorphisms of affine-ruled surfaces. If time permits, I will also present recent progress on the study of étale endomorphisms of rational homology planes in the context of the Generalized Jacobian Conjecture.

Marat Gizatullin (Samara)
Groups of automorphisms of some real open semialgebraic domains

A good pattern and a source of helpful techniques is a real plane hyperelliptic non-singular curve $y^2 = F(x)$ of some geometric genus g. Let D be a non-empty open domain whose boundary is a bounded circuit of the curve. If $g > 1$, then D is not homogeneous with respect to real Cremona transformations presrving D and well defined inside of the domain, although the group $\mathrm{Cr}_2(\mathbb{R})_D$ of such transformations is infinite-dimensional. Such a group preserves the line pencil $x = \mathrm{const}$, in other words, the group is a subgroup of the group of de Jonquières transformations associated with the pencil. If $g = 1$, then D is homogeneous with respect to the group $\mathrm{Cr}_2(\mathbb{R})_D$, because there are different curvilinear pencils whose properties are similar to the behavior of the mentioned line pencil and they produce useful de Jonquières-like subgroups of the group. This group is not simple. Its generators will be described during the talk. There are some multidimensional birationally homogeneous generalizations of the genus one oval, corresponding groups are not simple, but now we are far from a reasonable enumeration of their generators.

Egor Yasinsky (Moscow State University)
The real Cremona group and its finite subgroups

I will speak about the Cremona group of the real projective plane. Although the structure of this group is known to be very complicated, one can study it on the level of its finite subgroups. I will discuss some recent results in this direction, e.g. partial classification of finite subgroups, conjugacy problem, Jordan constant, etc.

Susanna Zimmermann (University of Basel)
The abelianisation of the real Cremona group

I will explain how to obtain the abelianisation of the real plane Cremona group, starting with generating sets and a relations, then I will work my ways up to a presentation of the group and end with the construction of the abeliansiation homomorphism.