ADMISSION AND ACCOMMODATION

Applications should be made on-line through our web site: http://www.cism.it/courses/J1702/.
A message of confirmation will be sent to accepted participants.

Registration feee:

- Euro 305,00 (Euro 250,00 + 22% Italian VAT taxes, where applicable - bank charges are not included). The fee includes course material, lodging for six days at CISM guest house, six fixed menu buffet lunches (on Saturday upon request), coffee breaks, social dinner and wi-fi internet access

- Euro 244,00 (Euro 200,00 + 22% Italian VAT taxes, where applicable - bank charges are not included). The fee includes course material, six fixed menu buffet lunches (on Saturday upon request), coffee breaks, social dinner and wi-fi internet access

Note that there are at most 20 beds at the CISM guest house

Applicants may cancel their course registration and receive a full refund (bank charges excluded) by notifying CISM Secretariat in writing (by email) no later than two weeks prior to the start of the course.

If cancellation occurs less than two weeks prior to the start of the course, a Euro 50,00 handling fee will be charged.

Incorrect payments are subject to Euro 50,00 handling fee.

For further information please contact:

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ACADEMIC YEAR 2017

Centre International des Sciences Mécaniques
International Centre for Mechanical Sciences

CISM

RATIONALITY, STABLE RATIONALITY AND BIRATIONALLY RIGIDITY OF COMPLEX ALGEBRAIC VARIETIES

CISM - EMS School
coordinated by

F. Zucconi
University of Udine
Italy

P. De Poi
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U. Bruzzo
Sissa, Trieste
Italy

Udine *September 3 - 9* 2017

RATIONALITY, STABLE RATIONALITY AND BIRATIONALLY RIGIDITY OF COMPLEX

The aim of the school is to bring together 20/30 young researchers in a cosy contest to teach them new results and methods on the generalised rationality problems, e.g. stable rationality, and the birational rigidity problem for rationally connected varieties. The two main courses will also be enriched by series of complementary lectures mainly focused on explicit calculations taught by two assistants who are distinguished researches themselves.

The School consists of two courses: Stable birational invariants and the generalised Lüroth problem (C. Voisin - assistant: M. Shen) and Birationally rigid and nearly birationally rigid varieties (I. Cheltsov - assistant: H. Ahmadinezhad).

Stable birational invariants and the generalised Lüroth problem

The lectures will discuss cohomological and Chow-theoretic obstructions to rationality or stable rationality of complex projective varieties. Of course, there are many such geometric obstructions, like the plurigenera, but we will rather focus on the case of rationally connected varieties, where these obvious obstructions are trivial. We will discuss:

- unramified cohomology and its link to the integral Hodge conjecture, (this provides very interesting irrationality criteria);
- various notions of decompositions of the diagonal.

The study of this stably birationally invariant property allowed Claire Voisin and subsequently other people to prove that many rationally connected varieties are not stably rational. Comparing this birational invariant with previously defined invariants (e.g. the Clemens-Griffiths criterion) is very interesting and has been completely done in dimension 3. This will be the last point developed in the lectures, if time allows.

Birationally rigid and nearly birationally rigid varieties

This series of lectures will focus on birational rigidity of rational connected varieties, and related topics such as solid Fano varieties. Birationally rigid varieties, among rationally connected ones, sit at the opposite end of the spectrum when compared to rational varieties. Their minimal model end-product is unique, hence the terminology. A smooth quartic 3-fold is the first know example of a birationally rigid variety. The main method used to prove rigidity is the method of maximal singularities, initiated by the celebrated work of Iskovskikh and Manin in the seventies. Other methods, include the use of Sarkisov links, analysis of the Mori cones of blow ups, classification of extremal contraction, and super-maximal singularities. Solid Fanos, introduced by Ahmadinezhad, generalise birationally rigid Fano varieties allowing us to get closer to a sensible classification of Fano 3-folds. All these will be discussed in great depth, with many explicit working examples. We also discuss an equivariant version of the theory. Some applications to the classification of conjugacy classes of subgroups of the Cremona group will also be discussed.

SCHEDULE

MONDAY September 4th

9.00 - 10.45 Registration

11.00 - 12.30 *Stable birational invariants and the generalised Lüroth problem* - Claire Voisin

12.30 - 14.30 Lunch

15.00 - 16.30 *Birationally rigid and nearly birationally rigid varieties* - Ivan Cheltsov

18.30 -19.30 Welcome Aperitif

TUESDAY September 5th

9.00 - 10.30 *Stable birational invariants and the generalised Lüroth problem* - Claire Voisin

11.00 - 12.30 *Birationally rigid and nearly birationally rigid varieties* - Ivan Cheltsov

12.30 - 15.00 Lunch

15.00 - 16.30 Exercise class by Mingmin Shen

17.00 - 18.30 Exercise class by Hamid Ahmadinezhad

WEDNESDAY September 6th

9.00 - 10.30 *Stable birational invariants and the generalised Lüroth problem* - Claire Voisin

11.00 - 12.30 *Birationally rigid and nearly birationally rigid varieties* - Ivan Cheltsov

12.30 - 15.00 Lunch

15.00 - 16.30 Exercise class by Mingmin Shen

17.00 - 18.30 Exercise class by Hamid Ahmadinezhad

20.00 - 21.30 Social Dinner

THURSDAY September 7th

11.00 - 12.30 *Stable birational invariants and the generalised Lüroth problem* - Claire Voisin

12.30 - 13.30 Lunch

13.30 - 15.00 *Birationally rigid and nearly birationally rigid varieties* - Ivan Cheltsov

FRIDAY September 8th

9.00 - 10.30 *Stable birational invariants and the generalised Lüroth problem* - Claire Voisin

11.00 - 12.30 *Birationally rigid and nearly birationally rigid varieties* - Ivan Cheltsov

12.30 - 15.00 Lunch

15.00 - 16.30 Exercise class by Mingmin Shen

17.00 - 18.30 Exercise class by Hamid Ahmadinezhad