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PROCEEDINGS OF THE CONFERENCE "EMBEDDED GRAPHS"

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The conference was held on October 27–31, 2014, at the Euler International Mathematical Institute and Chebyshev Mathematical Laboratory of the St. Petersburg State University.

The theory of combinatorial maps, or graphs embedded in two-dimensional surfaces, is a classical topic of combinatorics. For more than two centuries it was considered to be a beautiful domain of research which was, however, of a marginal significance for the mainstream development of mathematical sciences. The situation started to change dramatically in the 1980s. It gradually became clear that the theory of maps lies at the very center of a vast variety of theories ranging from models of quantum gravity to algebraic geometry, group theory and Galois theory. This multitude of relations led, among other things, to a terminological disparity: the same objects, maps, are known in various sciences as fat graphs, ribbon graphs, embedded graphs, graphs with rotations, and even, after Grothendieck, 'dessins d'enfants' (children's drawings in French). It is important to underline that all the above-mentioned aspects of the theory of maps are interrelated.

The main objective of the conference was to bring together specialists in different branches of science, mathematicians and physicists, studying various aspects of maps. According to the unanimous opinion of the participants, it was exactly this multidisciplinary format of the conference that determined its success. The following subjects were presented during the conference: the theory of dessins d'enfants which relates embedded graphs to Galois theory; regular maps and their symmetry groups; map enumeration and its relations to integrable systems of differential equations; Hurwitz numbers and enumeration of ramified coverings of the sphere; real algebraic geometry; low-dimensional topology; general graph theory. Two mini-courses were also given for students of the Chebyshev laboratory: one was devoted to the ELSV formula, and the second one to the Beauville algebraic surfaces of complex dimension two.

The site of the conference

`http://www.pdmi.ras.ru/EIMI/2014/EG`

contains abstracts of all the talks and slides of those talks which were prepared as computer presentations. The present volume is a collection of papers that represent several topics discussed at the conference.

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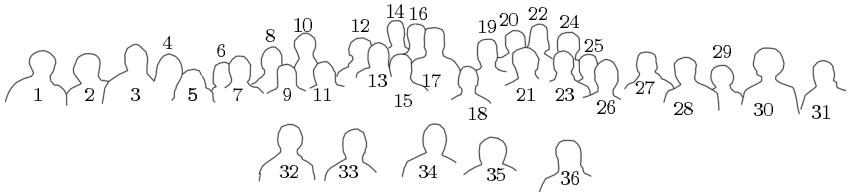

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