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Combinatorics

Organised by
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ABSTRACT. This is the report on the Oberwolfach workshop on Combinatorics, held 6–12 January 2008. Combinatorics is a branch of mathematics studying families of mainly, but not exclusively *discrete* (i.e. finite or countable) structures, often with connections to probability, geometry, computer science, and other areas. Among the structures considered in the workshop were *graphs*, *set systems*, *discrete geometries*, and *matrices*. The programme consisted of 15 invited lectures, 18 contributed talks, and a problem session focusing on recent developments in graph theory, coding theory, discrete geometry, extremal combinatorics, Ramsey theory, theoretical computer science, and probabilistic combinatorics.

Mathematics Subject Classification (2000): 05Cxx, 05Dxx, 52Bxx, 68Rxx.

Introduction by the Organisers

The workshop *Combinatorics* organised by Jeff Kahn (Piscataway), László Lovász (Budapest), and Hans Jürgen Prömel (Berlin) was held January 6st–January 12th, 2008. This meeting was very well attended with 46 participants from many different countries. The programme consisted of 15 plenary lectures, accompanied by 18 shorter contributions and a vivid problem session led by Vera T. Sós.

The conference is a workshop on Combinatorics in a very broad sense, and is in part intended to serve as a framework for all other Oberwolfach meetings that focus on particular areas within combinatorics. This meeting over the years has been extremely successful in achieving the sometimes elusive goal of bringing together and fostering interactions among people with a wide range of interests, and we feel that the program this time was close to ideal in its coverage of a large fraction of the most exciting recent developments across the combinatorial spectrum. Quite a few of the talks — for instance those of Chudnovsky, Kühn, Osthus, Ruciński,

Sudakov, Taraz and Vu — reported major progress on well-known problems. Some of the plenary speakers were asked to give overviews of areas somewhat distant from the central interests of many of the participants.

The breadth of the conference makes its contents nearly impossible to summarize. One might say that the central foci of the meeting were extremal and probabilistic aspects of combinatorics, and graph theory; but “extremal combinatorics” is an extremely broad term, and a glance at the titles below shows that the list of topics is not much shorter than the list of talks. Thus, even among the talks that could be considered to fall in the above categories, one finds geometry, Fourier analysis, algebra, physics, connections with social sciences, and multiple connections with computer science and related technology.

Again, we consider this breadth to be not a drawback, but a central feature of the meeting. It has promoted an inspiring, interactive atmosphere, and led to fruitful discussions and collaborations, to new awareness of what’s happening in different parts of combinatorics, and to the discovery of some unexpected connections.

More than in past meetings, an emphasis was placed on talks (both plenary and shorter) by younger researchers. This too worked very well, and we hope to make it the pattern for future meetings.

On behalf of all participants, the organisers would like to thank the staff and the director of the *Mathematisches Forschungsinstitut Oberwolfach* for providing a stimulating and inspiring atmosphere.