Oberwolfach Seminar: Positional Games

Organisers:
Dan Hefetz, Birmingham
Michael Krivelevich, Tel Aviv
Miloš Stojaković, Novi Sad
Tibor Szabó, Berlin

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Deadline for Applications: April 1st, 2013

Programme:

Positional games is a branch of Combinatorics, studying deterministic two player zero sum games with perfect information, played usually on discrete or even finite boards. The variety of games studied ranges from such recreationally popular games as Tic-Tac-Toe and Hex to abstact games played on graphs and hypergraphs. The subject of positional games is strongly related to several other branches of Combinatorics such as Ramsey Theory, Extremal Graph and Set Theory, the Probabilistic Method.

The aims of this seminar are:

- to introduce the subject and its basic notions;

- to acquiant the audience with the problematics and the variety of tools applied;

- to discuss some recent research results and some open problems in the field.

Major topics to be covered include: strong games and strategy stealing, unbiased Maker-Breaker games and winning criteria for Maker and Breaker, biased Maker-Breaker games, critical bias and tools for estimating it, probabilistic intuition, Avoider-Enforcer games and their bias monotone version, topics in biased games on complete and sparse boards.

Background and Preparatory Reading:

We will assume firm familiarity with the basic notions of Graph Theory. As for the subject itself (Positional Games), we will start from scratch. Yet, some preparation cannot hurt, and for those wishing to undertake it good sources are:

1. **J. Beck, Combinatorial Games: Tic-Tac-Toe Theory, Cambridge University Press, 2011**
   the standard textbook for Positional Games, covers a lot of material;

2. **J. Beck, Inevitable Randomness in Discrete Mathematics, American Mathematical Society, 2009**
   covers some additional topics, aiming to put it all in the very general context of the ubiquitous role of randomness in Mathematics;

3. **notes for the 4th Emléktábla workshop**, available at:
   www.math.tau.ac.il/~krivelev/games-Budapest_notes.pdf
   these notes are fairly accessible but not comprehensive and are meant to provide quick introduction to the subject and its problematics.