

WG4 Mathematics in Games

Group Description

Contacts of Reference: Lisa Rougetet, Tiago Hirth

The main goal of this WG is to share mathematical work related to games in order to understand the inner- and interconnections between games and mathematics. We are interested both in how people in the mathematics world(s) study games (which mathematical tools or concepts are required to find strategies), but also how people in the game world use mathematics in games (for game design for instance).

Many different branches of mathematics are involved in games' analysis, concerned with different aspects of play, such as rulesets, game space, pieces, strategies & tactics, players, and among others. For instance if a game has perfect information, random elements, zero to multiple players, simultaneous moves or not, etc.

Any field of mathematics is considered relevant: set theory; number theory; graph theory; combinatorial game theory; probabilities; statistics; game theory; topology; cryptography, etc.

The study of singular mathematical objects - games - allow us to deepen our knowledge in mathematics: it is not frozen in time, it is a human intellectual enterprise with a long history and an active, and understanding these processes of knowledge production is essential for current teaching.

Of course, WG4 has also strong connections with the other WG's objectives. A more detailed description can be found in the [memorandum of understanding](#) of the project.

Members of this WG show particular interest in:

- Algorithms and methodologies to study games and how to mediate its mathematics
- Break down games into properties (game states, etc.)
- Variability and stability of games
- Interplay between the histories of games and of mathematics

Objectives:

- Share Mathematical Methodologies from the various disciplines
- Present Case Studies in Mathematical Game Studies
- Connect and highlight researchers doing work on games and mathematics

Projected Outputs:

- Summer Schools on Mathematics in Games
- Articles from the WG4 network in diverse journals
- Dedicated issue in the *Recreational Mathematics Magazine*
- Curated Editorial of Relevant publications related to the topic

The primary channel for communication within WG4 is the following Google Group:

<https://groups.google.com/g/gametable-maths>