

Abstract

Oberwolfach Workshop:

Proof Complexity and Beyond

Dates:

24 March - 29 March 2024 (Code: 2413)

Organizers:

Albert Atserias, Barcelona

Meena Mahajan, Chennai

Jakob Nordström, Copenhagen/Lund

Alexander Razborov, Chicago

Proof complexity is a multi-disciplinary research area that addresses questions of the general form “how difficult is it to prove certain mathematical facts?” Having started in mathematical logic, it soon outgrew these boundaries. An exciting development of recent years is the observation that the analysis of an appropriately tailored concept of “proof” underlies many of the arguments in algorithms, geometry or combinatorics research that make the core of modern theoretical computer science. These include the analysis of practical SAT solving algorithms, the size of linear or semidefinite programming formulations of combinatorial optimization problems, the complexity of solving total NP-search problems by local methods, or the complexity of describing winning strategies in two-player round-based games, to name just a few important examples. Studying these problems under the common umbrella of proof complexity has led to many surprising connections between areas of theoretical computer science that appeared to be disjoint just a decade ago.

The workshop aims to bring together leading experts in proof complexity and related areas of theoretical computer science with the aim of strengthening the connections and stimulating further collaboration.