

Robust Combinatorial Optimisation: Complexity and Approximability

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Abstract:

Things don't turn out as planned. That truism also applies to most optimisation problems, where many sources of uncertainty may have impact on the quality of a solution. Robust optimisation is an approach that takes such uncertainty into account.

In this talk I focus on combinatorial optimisation problems, and give an introduction to some of the most common approaches to "robustify" them. Theoretical complexity results are discussed (perhaps not surprisingly, most problems are NP-hard). These results are complemented with a discussion of their approximability, and why it is the case that simple algorithms perform so well. Theoretical and practical complexity insights may tell quite different stories; therefore, the talk concludes with an outlook on how difficult the solution of such robust problems really is.