## Algorithms and software for hard optimisation problems



Our group is developing new techniques for solving difficult mixed integer nonlinear and combinatorial optimisation problems (MINLPs). These problems arise in a wide variety of scientific, engineering and business applications ranging from portfolio optimisation to design of logistic networks of a supply chain, scheduling of industrial operations and optimal layout of industrial facilities. Many of these problems are provably hard – all known algorithms to solve these problems take exponential amount of time in the size of the input. Since problems arising in practice are growing in size as well as complexity, there is a growing need to develop general-purpose, fast and robust optimisation solvers. The Minotaur solver developed in collaboration with the Argonne National Lab and University of Wisconsin at Madison (USA) is a fully open-source solver for MINLPs.

Over the last few years, our group has improved its performance manyfold by incorporating several new algorithmic and computational techniques into it. There are only a handful of MINLP solvers available world wide, and being free and open source makes Minotaur an especially attractive alternative to users who want to solve such problems as well as other researchers who want to study and develop faster algorithms.

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