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Proof complexity of quantified Boolean formulas

Quantified Boolean formulas (QBF) have been intensely investigated in the past two decades, both from a practical point of view (QBF solving) as well as from a theoretical perspective (QBF proof complexity) with many fruitful connections between the two fields.

In this talk I will survey recent results from QBF proof complexity and explain relevant proof systems and lower bound techniques. Particular emphasis will be laid on the connections between QBF proof complexity and circuit complexity, whereby many lower bounds for QBF proof size can be obtained via circuit size lower bounds.

A second thread will be devoted to modelling QBF solvers by QBF proof systems. This sheds light on the relative strength of different QBF solving paradigms.

The talk is based on joint work with many coauthors over the last years.