

Propositional Proof Complexity

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Propositional proof complexity studies efficient provability of statements that can be expressed in quantifier-free form, in various proof systems and under various notions of “efficiency”. Statements of interest come from a variety of sources that, besides traditional combinatorial principles and other mathematical theorems, include areas like combinatorial optimization, practical SAT solving and operation research. While many proof systems considered in the modern proof complexity are still traditional, in the sense that they are Hilbert-style and logic-based, a considerable amount of attention has been in recent years paid to systems modelling algebraic and semi-algebraic reasoning, including elementary convex geometry. In this talk I will attempt to convey some basic ideas underlying this vibrant area, including a necessarily based sample of illustrating examples.