The connection between propositional proof systems and combinatorial optimization has long been of interest to computer scientists, logicians, and mathematicians alike. For example, deriving valid inequalities for a given combinatorial optimization problem is equivalent to deriving a valid statement within an associated propositional proof system. Similarly, establishing unsatisfiability of a formula is equivalent to showing that the associated polytope of feasible points with coordinates in \([0, 1]\) does not contain any 0/1 point. Exploiting the underlying polyhedral structure, we will show that for certain types of formulas all potential proofs of unsatisfiability are long, having a depth of at least \(\Omega(n/\log n)\), independently from the chosen proof system. (Joint work with Andreas S. Schulz)

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