

# Independent sets, Lovasz' theta, and linear programming

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## Abstract

Combinatorial Problems have long been modeled as Integer Programs (IPs). These can then be "relaxed" by allowing those integer variables to be continuous resulting in Linear Programs (LPs). These can be solved efficiently both theoretically and practically. The trick is how to leverage these towards a solution for the original problem. – In this talk I will talk about using LPs to help solve the Maximum Independent Set problem (also known as Vertex Packing): you've got to add good/clever constraints. Here we'll add constraints that leverage the magic of Lovasz's theta function. And we'll prove the math that makes the algorithms tick.

**Keywords:** linear program, integer program, Maximum Independent Set Problem, Lovasz's theta function.