

Convex optimization and quantum information

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I will discuss connections between hard convex or polynomial optimization problems with topics in quantum information theory. These connections go in both directions: using optimization tools to solve quantum information problems, and using quantum information tools to solve optimization problems. In particular, I will discuss how the convergence of semidefinite programming hierarchies for polynomial optimization problems can be related to the quantum-information phenomenon known as the monogamy of entanglement. I'll then present applications of this connection to condensed-matter physics, and to the unique games conjecture. This talk will not assume background in quantum information.

This is based on joint work with Fernando Brandao and others, mostly contained in 1205.4484, 1210.6367 and [1310.0017](#).