

Why Semidefinite Programming?

Semidefinite programming (SDP) is an extension of linear programming where the nonnegative vector variables are replaced by positive semidefinite matrix variables. SDP offers excellent possibilities for the design of very tight relaxations for several combinatorial optimization problems, and has diverse applications in eigenvalue optimization, control theory, robust optimization, engineering, etc. The roots of SDP trace back to the sixties of the previous century, but the interest has grown tremendously during the last twenty years. Nowadays, semidefinite programming is one of the most exciting areas in mathematical programming.

In this talk we provide motivation, background, and some latest developments in SDP. We also present relaxations and corresponding bounds for the maximum cut, the traveling salesman problem, the bandwidth problem in graphs, and the graph partition problem.