

In this paper, we analyze two popular semidefinite programming (SDP) relaxations for quadratically constrained quadratic programs (QCQP) with matrix variables. These are based on vector-lifting and on matrix lifting and are of different size and expense. We prove, under mild assumptions, that these two relaxations provide equivalent bounds. Thus, our results provide a theoretical guideline for how to choose an inexpensive SDP relaxation and still obtain a strong bound. Our results also shed important insights on how to simplify large-scale SDP constraints by exploiting the particular sparsity pattern.

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