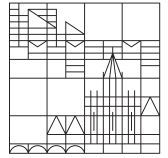


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Polynomial Optimization in non-commuting variables

Sabine Burgdorf

University of Konstanz, Germany

Abstract. Polynomial optimization problems arise across many sciences, e.g. in control theory, operations research, combinatorics and, computer science. However, very simple instances of polynomial optimization problems are known to be NP hard, thus approximation techniques based on sums of squares concepts taken from real algebraic geometry and inspired by moment theory from probability and functional analysis were developed. We focus on polynomial optimization problems in matrix variables, since many applied problems, e.g. in quantum chemistry, or in quantum information theory naturally involve polynomials in matrix variables.