RELAXATIONS FOR CLASSES OF ROBUST CONVEX POLYNOMIAL PROGRAMS WITH SPECTRAHEDRAL UNCERTAINTY

THAI DOAN CHUONG

In this talk, we present some results about relaxations for robust SOS-convex polynomial programs with general spectrahedral uncertainty (RP). Under a mild well-posedness condition, we provide a gap-free semi-definite linear programming (SDP) relaxation in the sense that the optimal values of (RP) and its relaxation problem are equal. The relaxation problem, which can equivalently be reformulated as an SDP, is a conical linear program with a coupled sums-of-squares polynomial constraint and linear matrix inequalities. Particularly, in the special case of robust convex quadratic program, we show how to find an exact optimal solution from the SDP relaxation problem when its optimal value is attained. We also show, under a general constraint qualification, that an exact SDP relaxation holds where the relaxation problem not only shares the same optimal value with the SOS-convex program but also attains its optimum. By this way, we want to extend the results to robust convex polynomial programs.

(Thai Doan Chuong) School of Mathematics and Statistics, University of New South Wales, Sydney NSW 2052, Australia

E-mail address: chuongthaidoan@yahoo.com

2000 *Mathematics Subject Classification.* Primary 49K99, 65K10; Secondary 90C29, 90C46.

Key words and phrases. Robust optimization, semidefinite linear programs, SDP relaxation, SOS-convex polynomial, spectrahedron.

Topics: Optimization problems.