



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

PHD STUDENT SEMINAR

Sum-of-Squares Optimization over G-Invariant Cones

By

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Abstract

We study sum-of-squares (SOS) optimization with a G-invariant symmetric structure. By restricting the polynomial space to the G-invariant subspace induced by a given group action, we obtain a smaller convex cone, thereby reducing the dimension of the polynomial coefficient space and the overall computational cost. Our main technical contribution is the construction of a logarithmically homogeneous self-concordant barrier for the dual of the G-invariant SOS cone, together with efficient evaluation of its gradient and Hessian. This barrier enables a homogeneous primal-dual interior-point algorithm to optimize directly over the reduced cone without semidefinite programming. We also apply this algorithm to compute upper bounds for the kissing number problem.

Date : 13 May 2026 (Wednesday)

Time : 3:00pm

Venue : Room 4475 (near Lifts 25/26)

All are Welcome!