



Graduate School Event

Thesis Defense: Overcoming Degeneracy and Singularity: Techniques for Semidefinite Programs and Homotopy Continuation Endgames

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Host: Matthew Kwan

Standard mathematical optimization and root-finding algorithms often stall or fail when faced with degenerate or singular problems. This thesis presents novel symbolic-numeric frameworks designed to overcome these theoretical and computational bottlenecks. The first part of the presentation introduces a hybrid algorithm that reformulates weakly feasible, degenerate semidefinite programs (SDPs) into structured polynomial systems, enabling the rigorous algebraic certification of numerical approximations. The second part addresses the loss of convergence in path-tracking methods near isolated singular roots. By modeling solution paths as generalized fractional Puiseux series and utilizing an explicitly derived algebraic predictor, the proposed algorithms restore superlinear convergence and significantly reduce computational overhead in heavily degenerate systems.

Friday, May 22, 2026 04:00pm - 05:00pm

Office Bldg West / Ground floor / Heinzl Seminar Room (I21.EG.101) and Zoom



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: <https://ista.ac.at/en/campus/how-to-get-here/> The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.