ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

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"Semidefinite Optimization in Discrete Geometry"

HS 11 | Wednesday, 25 November 2026 | 10:00 a.m.

Abstract

Discrete geometry is all about point configurations: What is the configuration with N points on a unit sphere in dimension n such that the pair-wise distance is maximal? What is the sphere packing in $\mathbb{R}^n$ with maximal density? What is the ground state configuration of N electrons on a sphere? In short, the problems optimize some quantity over a set of point configurations. Recently, many results have been obtained through semidefinite programming bounds. These give dual bounds on the optimal quantity; bounds that hold for every feasible point configuration. Although these semidefinite programs only give a bound on the optimal quantity, we can sometimes find an optimal configuration whose quantity matches the bound, in which case we often can prove uniqueness (up to the symmetry of the problem).

After an introduction to the problems in this field, the talk will mostly focus on a semidefinite programming hierarchy for the spherical cap packing problem (maximize the number of points on a unit sphere with a minimal pairwise distance).

Viktoriia Grushkovska and the Department of Mathematics look forward to seeing you at the talk!