ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

Invitation to the Doctoral Seminar

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"The Flag Algebra of Rooted Binary trees"

N.2.35 | Wednesday, 15 May 2024 | 10:00 a.m.

Abstract
Rooted leaf-labeled binary trees are objects introduced, and widely used, in phylogenetics. In particular, the question of their densities, and how they behave in graphs of size growing to infinity, is of great importance in this field. In this talk, we explain how we extend Razborov's flag-algebra theory, a very powerful tool of extremal combinatorics, to this setting. This allows the application of sums-of-squares and moment techniques to extremal questions about trees. This new approach enables us to use semidefinite programming to improve existing bounds and obtain new ones on the inducibilities of trees, that is, their maximum limit densities. Moreover, we are able to obtain the first approximations of density profiles of rooted leaf-labeled binary trees, which represent all possible simultaneous densities of a pair of trees, and prove non-convexity of some of them.

Angelika Wiegele and the Department of Mathematics look forward to seeing you at the talk!