

TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Wednesday, 4 April 2018, 4:00 p.m.
Room 617 Wachman Hall

(refreshments and social at 3:45 p.m)

Computation of the joint spectral radius by optimization techniques

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Abstract. The joint spectral radius (JSR) of a set of matrices characterizes the maximum growth rate that can be achieved by multiplying them in arbitrary order. This concept, which essentially generalizes the notion of the "largest eigenvalue" from one matrix to many, was introduced by Rota and Strang in the early 60s and has since emerged in many areas of application such as stability of switched linear systems, computation of the capacity of codes, convergence of consensus algorithms, trackability of graphs, and many others. The JSR is a very difficult quantity to compute even for a pair of matrices. In this talk, we present optimization-based algorithms (e.g., via semidefinite programming or dynamic programming) that can either compute the JSR exactly in special cases or approximate it with arbitrary prescribed accuracy in the general case.

(Based on joint work (in different subsets) with Raphael Jungers, Pablo Parrilo, and Mardavij Roozbehani.)