MECHANICAL ENGINEERING SEMINAR

Monday, June 23 2025 at 14:30, D. Dan and Betty Kahn Building, Room 217

Asymptotic stability of linear systems with restricted connectivity

Vadim Zharnitsky

Department of Mathematics and Coordinated Sciences Laboratory
University of Illinois at Urbana-Champaign
Urbana, USA

Email: vzh@illinois.edu; Website: https://math.illinois.edu/directory/profile/vzh

Hosted by: Prof. Gendelman Oleg

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Abstract: We investigate the conditions under which a given network topology can support an asymptotically stable equilibrium in linear systems, in both discrete and continuous time. This question arises naturally in the study of decentralized networked systems, where stability properties are constrained by the underlying connectivity structure. The study of such systems was initiated by M.-A. Belabbas approximately a decade ago, and he had obtained some conditions for stability. I will first present the key results of his theory, and then present our recent work on the switching (nonautonomous) case, where system dynamics can be time-varying but with the fixed network topology. Finally, I will outline preliminary results on generalizing these ideas to certain classes of nonlinear systems. This is joint work with M.-A. Belabbas and D. Liberzon (ECE), and R. Bivziuk (Mathematics).

For external speakers: bio sketch: Vadim Zharnitsky received his PhD from Rensselaer Polytechnic Institute, NY, USA in 1996. He had postdoctoral positions at Los Alamos National Laboratory and Brown University and then was a staff member at Bell Laboratories in 2000-2202. Since 2003 he has been a faculty member in mathematics department, University of Illinois.

Seminars Coordinator: Assoc. Prof. Shmuel Gal.