

Robust Stabilization with Guaranteed Performance in Heterogeneous Multi-agent systems with Nonlinear Uncertain Couplings

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Abstract: Systems of physically interconnected multiple agents cooperating toward a common goal have received considerable attention lately, with applications in large-scale and cyber-physical systems. Distributed consensus ideas have been recognized as a more attractive approach compared to the centralized and decentralized ones. In this talk I will present recent results on stabilization, decoupling, and cooperative tracking in multi-agent systems subject to various types of challenges, such as mixed order linear dynamics, mixed matched/unmatched state-coupled nonlinear uncertainties in the agents' dynamics. A unifying, easy-to-implement framework is developed using graph theory and optimal control formulation, to provide stability and guaranteed cost of the distributed communication topologies.

This is a joint work with the former PhD student and current postdoctoral DU research associate, Dr. Vahid Rezaei.



Bio: Margareta Stefanovic received a Ph.D. degree in Electrical Engineering (Control Systems) from the University of Southern California and is currently an Associate Professor of Electrical Engineering at the University of Denver. Her main research interests are in the areas of data-driven robust adaptive control, and distributed control of multi-agent systems. She serves as an Editor-at-Large for Journal of Intelligent and Robotic Systems and as an Associate Editor of ISA Transactions. Prof. Stefanovic is a Senior Member of the Institute of Electrical and Electronics Engineers (IEEE).