SysCon Seminars

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Aug 12 (Wed), 2026

Lift before Control

Abstract

Lifting is widely used in dynamical systems to enable tractable prediction. However, these advantages do not always translate into improved control performance due to model approximation and singularities. We consider novel finite liftings, in state space and spatial frequency domain, that overcome control limitations in canonical civil infrastructure settings. Our approach enables the inclusion of additional performance metrics in traffic network control while maximizing throughput, even under model uncertainty and incomplete measurements. We also extend classical control to distributed parameter systems with complex boundary conditions, e.g., for better water treatment and nuclear reactivity control.

Speaker Bio

Ketan Savla is an Associate Professor and the John and Dorothy Shea Early Career Chair in Civil Engineering at the University of Southern California. Prior to that, he was a research scientist in the Laboratory for Information and Decision Systems at MIT. His current research interest is in distributed optimal and robust control, dynamical networks, state-dependent queuing systems, and mechanism design, with applications in civil infrastructure and autonomous systems. His recognitions include NSF CAREER, an IEEE CSS George S. Axelby Outstanding Paper Award, the AACC Donald P. Eckman Award, and the IEEE ITSS Outstanding Application Award. He is also a co-founder and the chief science officer of Xtelligent, Inc.