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APPLIED MATHEMATICS SEMINAR 291

Data-driven Computational Optimal Control Algorithms for stochastic dynamical systems

Date: **9/27/19**
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Location: **COB1 265**

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Abstract

In this talk I will address the design of optimal control strategies for high-dimensional stochastic dynamical systems. Such systems may be deterministic nonlinear systems evolving from random initial states, or systems driven by random parameters or processes. The objective is to provide a validated new computational capability for open-loop and feedback optimal control, which will be achieved more efficiently than current state-of-the-art methods. The new framework utilizes direct multi-shooting discretization with vectorized gradient computation and adaptable memory management. I will also present a new data-driven deep learning method to compute optimal feedback controls based on semi-global solutions of the Hamilton-Jacobi-Bellman equation. The algorithms are demonstrated to be scalable to high-dimensional nonlinear control systems with random initial condition and unknown parameters.