The Department of Civil and Environmental Engineering at the University of Houston presents...

CIVE 6111 Graduate Seminar

Data-Driven Discovery of Intrinsic Dynamics

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Kalsi Assistant Professor of Mechanical Engineering at University of Houston

Friday, November 18**, 2022**
2:45pm-3:45pm
Classroom Business Building (CBB) - Room 104
Zoom: https://uh-edu-cougarnet.zoom.us/j/95702511696?pwd=VFIybkh4emhETHNITGV0dXRHS3pIZz09

Abstract

Mathematical models underpin our ability to understand, predict, and control the dynamics of natural systems. Whether models are developed from first-principles derivations or from observational data, they are predicated on our choice of state variables. The choice of state variables is driven by convenience and intuition, and in the data-driven case they are often chosen to be the measurable variables. In truth, these variables are often highly redundant and the system is driven by a much smaller set of latent intrinsic variables. In this talk, I will discuss how to find these intrinsic variables—and their dynamics—directly from data. I will demonstrate the approach on several high-dimensional dynamical systems with hidden low-dimensional behavior. The resulting framework provides the ability to develop dynamical models of the lowest possible dimension, capturing the essence of a system.

Bio

Daniel Floryan is the Kalsi Assistant Professor of Mechanical Engineering at the University of Houston. He received his B.S. in mechanical engineering and B.A. in economics from Cornell University, and his M.A. and Ph.D. in mechanical and aerospace engineering from Princeton University, where he graduated as the Porter Ogden Jacobus Fellow. His research is at the intersection of fluid mechanics and nonlinear dynamics, with interests in bio-inspired locomotion and using data to model and control dynamical systems.