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PRESENTED BY THE WATERLOO INSTITUTE
FOR SUSTAINABLE ENERGY

Wednesday August 2, 2017
10:30 am – 11:30 am
CPH 3681

PHYSICS-BASED CONTROL OF ENERGY SYSTEMS RANGING FROM SMART BUILDINGS AND POWER GRID TO SMART HYBRID ELECTRIC VEHICLES

Mahdi Shahbakhti, Associate Professor,
Mechanical Engineering – Engineering Mechanics,
Michigan Tech

Control of complex energy systems requires knowledge of multi-physics system dynamics and integration of this knowledge into controller design. In this talk, innovative model-based control techniques are illustrated for various complex energy systems including building heating ventilation air conditioning (HVAC) systems, building to power grid operating systems, and hybrid electric vehicles.

A novel exergy-wise control framework will be introduced. The benefit of the proposed framework will be demonstrated for energy systems in the transportation and building sectors, which combined consume 59% of the total energy in the world.

Biography



Mahdi Shahbakhti is an associate professor of Mechanical Engineering at Michigan Technological University, where he conducts research in the area of controls and energy systems. Prior to joining Michigan Tech in 2012, he was a post-doctoral scholar at the University of California-Berkeley for two years. He received his Ph.D. in Mechanical Engineering from the University of Alberta in Canada in 2009. An ASME and SAE member, Shahbakhti has been doing research in the area of controls, powertrains, and energy systems for the past 17 years. His research centers on developing dynamical models and novel control techniques with applications in vehicles and building energy systems. He is the author of over 120 refereed publications in the field of powertrain, energy systems and controls.

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