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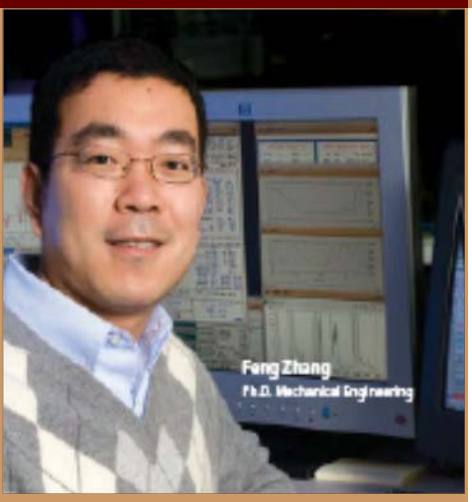
Challenges in Real World Control Systems Development: Perspectives of a UH Graduate



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Abstract: The seminar will present practical challenges that control system engineers face in the automotive and wind turbine industries. The challenges are similar in their aspects of addressing the variability in the dynamics of these nonlinear systems, The presentation will start with the lean burn air-fuel ratio control in internal combustion engines, A systematic development of an air-fuel ratio controller based on post-Lean NOX Trap (LNT) exhaust gas oxygen sensor feedback using linear parameter-varying (LPV) control is presented. Controller simplification for implementation purposes and vehicle test results are presented. Satisfactory stability and disturbance rejection performance is obtained in the face of the variable time delay. Then, the challenges and difficulties in to convert this research results into real vehicle control applications are discussed. The gap between practical vehicle control application and control research is explained in the second part of the presentation. Subsequently, the general wind turbine control problem is introduced. Pitch regulated wind turbine control objectives and goals are defined along with proposed solutions. The challenges in wind turbine and wind farm control are discussed along with future aspects of this technology

Biography: Dr. Zhang received his Ph.D. in Mechanical Engineering from the University of Houston in 2005. He worked as a Research Engineer at the Research and Innovation Center at Ford Motor Company in Dearborn, Michigan investigating automatic control solution to improve fuel economy and reduce emissions in powertran systems. He also has been employed as an engineer with General Motors in China on the development of new technologies for automotive vehicles. Currently, he is Research and Development Director for Envision Energy, a worldwide energy company, where he is in charge of new technology developments for wind turbine and wind farm systems.