

**PRINCETON/CENTRAL JERSEY SECTION OF IEEE
CIRCUITS AND SYSTEMS CHAPTER**

Sliding Mode Control for Systems with Slow and Fast Dynamics

Speaker: Thang Nguyen, Rutgers University

Time: Friday, March 26, 2010. Meet the speaker 5:15-5:30pm. Talk 5:30-6:30pm.

Place: Rutgers University, Busch Campus, Piscataway Electrical Engineering Bld., Room 240

Abstract

Sliding mode control is a type of variable structure control, where sliding surfaces are designed such that the system trajectories exhibit desirable properties. A system using a sliding mode control strategy can display a robust performance against parametric uncertainties and exogenous disturbances. There are many applications of sliding mode control to power electronics, wind turbines, solar energy, and other power and energy systems. In this talk, the problem of sliding mode control for systems with slow and fast dynamics, which are attributed to a small parameter, corresponding to small time constants, small masses, small moments of inertia, and so on, is addressed. Two groups of sliding mode control methods are proposed. In the first group, the decomposition technique is employed to design a sliding mode control law for a system with slow and fast modes. Lyapunov approaches are used in the second direction. Theoretical and simulation results show the effectiveness of the proposed methods. Applications to some real physical systems are presented.

Biography: Thang Nguyen received B.E. degree and M.Sc. degree in Automatic Control in 2002 and 2004 both from Hanoi University of Technology. He is currently a PhD candidate in the Department of Electrical Engineering, Rutgers University, and will get his doctoral degree in May 2010. His research interests lie in the area of control systems, particularly singularly perturbed systems, sampled-data systems, optimal control, robust control, sliding mode control, nonlinear observers, systems biology, applications of control theory to energy and power systems. He is the author of several journal and conference papers, including papers published in *IEEE Transactions on Automatic Control* journal.