UNIVERSITY OF MACAU
FACULTY OF SCIENCE AND TECHNOLOGY
DEPARTMENT of CIVIL and ENVIRONMENTAL ENGINEERING

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On the Time Delay of Dynamical Systems

By

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Date : 16/01/2013 (Wednesday)
Time : 16:00 – 17:30
Venue : HG01

Abstract

In this talk, several interesting applications of time delay of dynamical systems are discussed, including human gait, metal cutting on the lathe, and car following models. The recent results of analysis and control of time-delayed dynamical systems are presented. Some numerical methods for solutions of delayed differential equations (DDE) are reviewed, pointing out that several popular methods for analysis and control of dynamical systems with time delay can be formulated in the general framework of the abstract Cauchy problem for DDEs. We then present a continuous time approximation method and show its prediction power both in frequency and time domain. We also consider the stability of linear systems with delayed feedback controls and compare the prediction of stability boundaries in the feedback gain space by various methods including Lyapunov, Padé approximation, and mapping approach. Several control applications of dynamical systems are discussed. An experimental validation of

the optimal-gain feedback control is presented.

About the Speaker

Professor Jian-Qiao Sun got his Ph.D. and M.S. in Mechanical Engineering from University of California at Berkeley. He is currently a professor in the School of Engineering in University of California, Merced. His fields of study cover solid mechanics, dynamics and applied mathematics. He is ASME fellow and the Scholar of One Thousand Plan of China. He wrote, edited, or contributed to eleven books covering nonlinear stochastic dynamics and control of time-delayed dynamic systems. He is the editor-in-chief, associate editor, and editorial member of eight international journals. He published over 110 papers in international journals.

ALL ARE WELCOME!