



AN HONORS UNIVERSITY IN MARYLAND

Department of Mechanical Engineering

Fall 2006 Seminar Series, Friday- Sept. 8th, ITE 227 at 2:30pm

Current Research in the Dynamic Systems and Vibrations Laboratory at UMBC

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Abstract

In this talk I will first give an overview of my efforts to develop a nationally competitive education and research program in dynamic systems at UMBC, some current research activities in the Dynamic Systems and Vibrations Laboratory (DSVL), and some of our accomplishments. Since its inception in 1999, the DSVL has been engaging in a wide range of challenging theoretical problems, including analysis of time-varying and infinite-dimensional systems, nonlinear analysis, stochastic analysis, inverse modeling, and joint modeling. Experiments are designed and conducted using the state-of-the-art equipment to validate the theoretical predictions. The research has a variety of applications, such as the design of elevators, belt and tape drives, and power transmission lines, as well as nondestructive testing and modal testing. This research has been supported by three multi-year awards from the dynamic systems program of the National Science Foundation, and funding from industry and the State of Maryland.

I will then focus on: 1) a new dynamic stability theory for translating media with variable length and/or speed; 2) a robust iterative algorithm for structural damage detection using a minimum number of vibration measurements, along with new physics-based methods to model structures with L-shaped beams and bolted joints; and 3) novel stochastic models for the random impact test method in modal testing. Experimental results on a novel scaled elevator, damage detection, and joint modeling will be demonstrated.

Biographical Sketch

Weidong Zhu is an Associate Professor in the Department of Mechanical Engineering at the University of Maryland, Baltimore County (UMBC), and the founder and director of its Dynamic Systems and Vibrations Laboratory. He received a double major BS degree in Mechanical Engineering and Computational Science from Shanghai Jiao Tong University in 1986, a MS degree in Mechanical Engineering from Arizona State University in 1988, and a Ph.D. degree in Mechanical Engineering from the University of California at Berkeley in 1994. Prior to joining the UMBC in 1999, he was an Assistant Professor at the University of North Dakota and the Chinese University of Hong Kong. His research spans the fields of dynamics, vibration, control, applied mechanics, and structural health monitoring, and involves analytical development, numerical simulation, experimental validation, and industrial application. He is a recipient of a CAREER award and two individual investigator awards from the National Science Foundation.

Refreshments will be served
Host: Dr. Panos Charalambides