November 2005

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Event Sense

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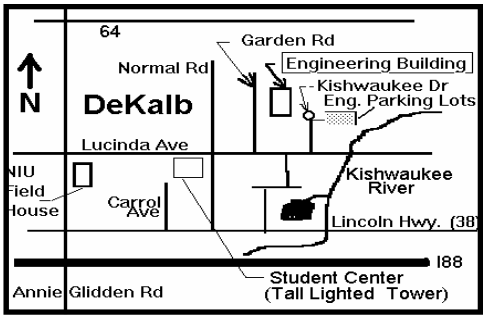
RRVS Section and Computer/Control Systems Chapter Meeting

Active Vibration Control and Model Updating in Structural Dynamics: Linking Control to Industry

When Tuesday November 15, 2005

Where

Northern Illinois University, **DeKalb**, IL; Engineering Building, Room 209. Please call Don Zinger at



753-0540 if you need directions from outside DeKalb. Parking will be allowed in the engineering parking lot behind the engineering building after 5:00 PM at no charge.

Agenda

6:00 PM	Social
6:30 PM	Dinner
7:30 PM	Presentation

Program

The use of active feedback control strategy is a natural way to stabilize and control dangerous vibrations in structures such as bridges, highways, buildings, and space and air crafts. These structures are distributed-parameter systems. However, because of practical considerations such a system is very often discretized into a system of matrix second-order differential equations using finite-element techniques; control is then designed and implemented on this discretized system and, finally, applied to a real-life structure. Unfortunately, existing vibrations control techniques, even for these simplified models, have limitations. The vibration industries have approached vibration control problems in an ad hoc way.

In the last few years, the speaker and his collaborators have developed a practical approach for feedback control in vibrating structures. The distinctive features of this approach are (i) control can be designed directly on finite models without requiring transformation to a standard first-order state-space form, (ii) the algorithms require knowledge of only a small number of frequencies and mode shapes, and (iii) above all, no a priori reduction of the order of the model or controller is required, no matter how large the problem is. This approach has also been successfully applied to another related industrial problem, namely, the finite-element model updating problem. The minimal computational and engineering requirements of this new approach make it readily applicable to feedback control design and model updating in even very large practical-life structures.

In this talk, these recent advances will be reviewed and a brief discussion will be presented on future directions of research in this area.

Speaker

Professor Biswa Datta is a Distinguished Research Professor at Northern Illinois University. He is a Professor of Mathematical Sciences and an Adjunct Professor of Electrical and Mechanical Engineering at NIU. He was elected to a Fellow of IEEE in 2000 for his interdisciplinary contributions. He is the author of more than one hundred interdisciplinary papers and two books.

Meal Reservations

Dinner will feature a beef, pork, chicken and vegetable Chinese buffet. Please make your **dinner reservations** by **call**ing **Tricia at 815-753-9974 or sending an email (fisher@ceet.niu.edu) by Friday, November 11, at noon**. Please include the following information: your name, phone number, email address, and IEEE member number. Dinner is $7 for members, $5 for student members, $13 for non-members and $7 for non-member students. Unemployed members may call one of the officers for special arrangements.

Note

The meeting is open to the general public. You need not be an IEEE member. Guests are welcome. Please call Tricia at 815-753-9974 for questions.