

FALL 2006 SEMINAR SERIES

Date: Thursday, August 31, 2006

Time: 11:00 am - 12:00 pm

Room: SL 165

Reception at 10:45 am (cookies and refreshments served)
Everyone is invited

Nonlinear Aeroelastic Model Identification

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Abstract. Aeroelastic instability, or flutter, is the divergent dynamic response of a flexible body in an airstream. Aircraft wing flutter, which occurs under specific flight conditions, can result in catastrophic structural failure of the wing. Consequently, predicting flutter conditions is critical for maintaining pilot safety and vehicle integrity. Accuracy of flutter prediction tools depends heavily on the underlying aeroelastic models used in the prediction analysis; and, one difficulty in identifying an accurate aeroelastic model stems from the presence of nonlinear dynamic behavior observed in structural response data measured during flight. Therefore, nonlinear system identification techniques are necessary for identifying accurate dynamic models from such data. This presentation covers a spectral based nonlinear system identification technique and its application to aircraft flight data.

About the Speaker. Dr. Christopher Richards joined the Department of Mechanical Engineering at the University of Louisville in August 2001. Prior to this appointment he worked three years for Caterpillar, Inc. as a Senior Research Engineer where he assisted in the development of "ride control" for backhoe and wheel loaders. He also played an integral part in the development of a semi-active seat suspension for off-highway vehicles. Chris has spent two summers as a NASA Faculty Fellow at Dryden Flight Research Center working on the Active Aeroelastic Wing (AAW) program. Current research includes development of a concept modeling software for military vehicle architectures, nonlinear identification and semi-active control of aeroelastic systems, indirect force identification, and testing and design of prosthetic heart valves.