Course 103: Operational Modal Analysis: Background, Theory & Practice

Sunday, January 29, 2012

Course Description

This is a one day course covering operational modal analysis based on unmeasured excitation, for example, natural excitation. The course will cover the theory behind analysis techniques such as Frequency Domain Decomposition, FDD, as well as the time domain technique, Stochastic Subspace Identification, SSI, will be covered together with a brief overview of other techniques. The techniques will be illustrated by several application examples from Civil Engineering Structures such as buildings and bridges, and Mechanical Engineering Structures such as automotives and space structures. The theory will be illustrated by several demonstrations originating from real life measurements.

Who Should Attend

Engineers and researchers who have basic knowledge of modal analysis and who would like to expand their knowledge into the field of Operational Modal analysis in order to be able to solve the problems when the excitation is unknown as in civil structures excited by wind traffic etc. or mechanical structures in operational conditions such as rotation.

Course Outline

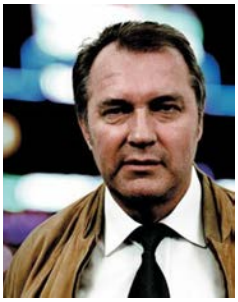
- Welcome and Introduction
- Signal vs. System Analysis
- Operational Modal Analysis Theory
- Frequency Domain Decomposition, FDD
- Enhanced Frequency Domain Decomposition, EFDD
- Curvefit Frequency Domain Decomposition, CFDD
- Stochastic Subspace Identification, SSI
- State Space Models
- Harmonic Detection using Kurtosis
- Use of Projection Channels
- Time-Frequency Analysis
- Applications and use of OMA
- Test Planning, Testing and Data Quality Control
- Application Examples and Case Studies

Course Fee

The *regular* course fee for *Operational Modal Analysis: Background, Theory & Practice* is $350, and the *student* course fee is $175. Course fee includes lunch, course handout material, and refreshment breaks. Lodging and additional food or materials are not included

Instructors

Prof. Svend Gade, Brüel & Kjær University



Prof. Gade joined Brüel & Kjær in 1980, where he is now working as an application specialist in the Sound & Vibration Measurement A/S. Currently he is an Associate Professor at the Brüel &Kjær University. His responsibilities include digital signal analysis, sound intensity, sound power, modal analysis, signature analysis, acoustic holography (STSF) and Sound Quality. He has written more than 150 papers and articles and lectured extensively throughout the world including Japan and USA. Prof. Gade holds an M.Sc. degree from the Danish Technical University in Copenhagen in electronics/acoustics and is educated as a lecturer as well. He is a member of the Institute of Noise Control Engineering, INCE and SEM, the Society for Experimental Mechanics, Inc.

Prof. Carlos E. Ventura, The University of British Columbia

Prof. Ventura is a Civil Engineer with specializations in structural dynamics and earthquake engineering. He has been a faculty member of the Department of Civil Engineering at the University of British Columbia (UBC) in Canada since 1992. He is a registered professional engineer in British Columbia, California and Guatemala. He is currently the Director of the Earthquake Engineering Research Facility (EERF) at UBC, and is the author of more than 250 papers and reports on earthquake engineering, structural dynamics and modal testing. He is a member of several national and international professional societies and advisory committees. Prof. Ventura has conducted research for more than twenty-five years in the dynamic behavior and analysis of structural systems subjected to extreme dynamic loads, including severe ground shaking. His research work includes experimental studies in the field and in the laboratory of structural systems and components. His current research is focused on the development of performance-based guidelines for seismic retrofit of schools, on methods to evaluate the interaction between critical infrastructure vulnerable to natural and man-made hazards, and on structural health monitoring of bridges.

Attendees may want to bring personal laptop computers, but they are not required. Course notes will be provided on a memory stick.