

Course 103: Using MATLAB® for Noise & Vibration Analysis

Sunday, February 3, 2008, 8:30 am - 5:00 pm

Instructors

Prof. Kjell A. Ahlin, Axiom EduTech AB/Blekinge
Institute of Technology
Lic. Eng. Anders Brandt, Axiom EduTech AB

Course Objective

In recent years, systems for multichannel data acquisition of noise and vibration signals have become available at much lower cost than before. In the meantime, MATLAB® has become a leading software for engineering computations at universities as well as in industry. MATLAB can be used as a very cost effective solution for the engineer who needs powerful software for analyzing vibration data. MATLAB is also an excellent complement for the user of commercial software for noise and vibration analysis, as it adds possibilities for post processing results. This short course will give an overview of how MATLAB can be used as an efficient tool for analyzing data from typical vibration applications such as data acquisition, frequency analysis, rotating machinery analysis, modal analysis, system simulation, and fatigue analysis. In the course we will show examples of real-time data acquisition of signals for modal analysis and order tracking applications with The VibraTools Suite™ toolboxes for MATLAB, and subsequent data processing.

Course Content

Overview of MATLAB

We start by giving an overview of the MATLAB environment and show how it can be customized to handle typical vibration data. Advantages and disadvantages compared with other software will be discussed. We will also show an example of how large channel counts can be handled in an efficient way.

Measuring and Analyzing Vibration Data

Using MATLAB for frequency analysis poses some important questions on time windows, spectrum scaling etc. We will demonstrate how MATLAB can be used for data acquisition and subsequent frequency analysis, statistical analysis and data quality assessment. A part of the session is dedicated to rotating machinery analysis and order tracking, including synchronous resampling and Vold-Kalman filtering.

Advanced Data Analysis

In the last part, we show how MATLAB can be used for advanced analysis options such as modal analysis, system simulations, and Fatigue analysis.

Course Material

Copies of overhead slides and a CD with useful MATLAB scripts will be supplied to all participants.

Instructors



Prof. Kjell A. Ahlin is Professor of Mechanical Engineering at Blekinge Institute of Technology and has over thirty years experience as a consultant in the field of applied signal analysis. He has been working with applications of applied signal processing in areas such as vibrations, structural dynamics, environmental engineering and signal classification. He also has a broad experience in teaching and he is a popular lecturer. Prof. Ahlin is active in international standardization in the vibration field and has been chairing several working groups.



Lic. Eng., Anders Brandt is President & CEO of Axiom EduTech, Sweden. Mr. Brandt has twenty years experience in applications of signal analysis in acoustics, experimental structural dynamics and mechanical wave propagation in structures. Mr. Brandt is also affiliated with the Department of Signals and Systems, Chalmers University of Technology and the Department of Telecommunications and Signal Processing at Blekinge Institute of Technology (BTH), both in Sweden. At BTH, he is lecturing classes in noise and vibration analysis. Mr. Brandt has a long experience with different commercial systems for advanced structural dynamics, such as LMS CADA-X, I-DEAS Test, and MATLAB.

Attendees are strongly encouraged to bring their own laptop computers.
There will be no computers made available.

Course Fee

The *regular* course fee for *Using MATLAB® for Noise and Vibration Analysis* is \$300, and the *student* course fee is \$150. Course fee includes box lunch, course handout material, and refreshment breaks. Lodging and additional food or materials are not included.

MATLAB® is a trademark by The MathWorks, Inc.