

## NOISECON 2010 Short Courses

### **Course #3: Modeling using Coustyx – Fast Multipole BEM**

**Instructors:** Rajendra Gunda, Advanced Numerical Solutions. [rajendra.gunda@ansol.com](mailto:rajendra.gunda@ansol.com)  
Other ANSOL Associates.

**Day:** 18 April 2010

**Time:** 1:00 pm – 5:00 pm

**Location:** Baltimore Marriott Waterfront Hotel

**Cost:** \$200 INCE members. \$250 non-members (early registration. before 19 March 2010)

\$250 INCE members. \$300 non-members (after 19 March 2010)

**Description:** Coustyx software integrates the fast multipole method with advanced boundary element formulations to yield fast and accurate solutions of very large scale problems in acoustics. This course will give a brief overview of how the FMM achieves this rapid speedup and scaling. Detailed examples of practical industrial problems such as noise radiation from gearbox housings, loud speaker design, sound fields in automotive cabins - panel contribution analysis and effect of acoustic treatments, muffler performance characteristics such as transmission loss and insertion loss calculations will be presented. The course will address the following topics:

- Overview of the Fast Multipole Method, and its integration with BEM formulations.
- Building acoustic models in Coustyx - Demonstrated in detail through example cases. Some of the tasks that will be covered are
  - Preprocessing tasks in Coustyx that help in creating a good BEM mesh starting from a structure FEM mesh.
  - Application of boundary conditions and noise sources, and analysis sequences
  - Reviewing Coustyx Results – Field point SPL and velocities, directivity patterns, ISO sound power, iglass post-processing files.
- Advanced scripting capabilities using the Coustyx programming language.

Note: Coustyx licenses will be provided for the duration of the course for hands-on experience.

Rajendra Gunda is a Project Scientist at Advanced Numerical Solutions. He has over 20 years experience in acoustic modeling, simulation and design. He is the originator, and has participated in the development of Coustyx. His areas of expertise are structural dynamics, acoustics, fluid-structure interaction, and noise control. He is also a Visiting Research Scholar at the Acoustics and Dynamics Laboratory of The Ohio State University. As a Senior Development Engineer at the Goodyear Tire and Rubber Company, Dr. Gunda's research of tire-road interaction noise generation mechanisms lead to the design of a line of quiet tires. He has several publications in the area of structural dynamics and holds two US Patents (D450267, D449572).

Other instructors will include members of ANSOL Staff who have contributed extensively to the development of Coustyx, and have worked on several noise control consulting projects.