# COUSTYX

## Fast Multipole Acoustics

Coustyx is a next generation acoustic analysis software that combines fast multipole technology with boundary element method. Advancements in Coustyx allow you to perform fast NVH analysis on very large models (1 million unknowns) over a broad frequency band (ka=0.01 to 300). Intuitive, feature-rich Graphical User Interface makes model setup effortless, saving you time and money.
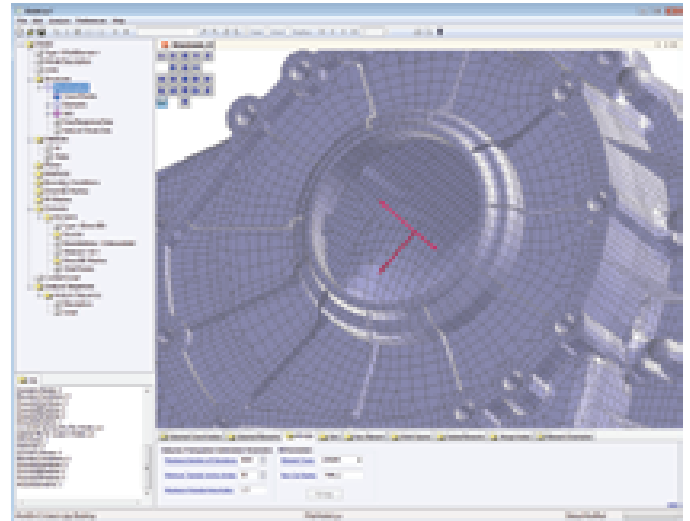


## Benefits

- Built on FMM-BEM technology
- Large models (1 Million unknowns)
- Fast, accurate solutions (50x faster)
- Broad frequency band (ka=0.01 to 300)
- Multi-core implementation with linear speedup
- Intuitive GUI
- Translators for commonly used FEA data formats
- Effortless model setup
- Integrated pre/post processors
- Great value for money
- Responsive technical support

## Features

- Interfaces: Radioss, Nastran, Ansys, Abaqus, Universal files
- Mesh preparation tools: skinning, fill holes, stitch gaps, flip elements, create or delete elements
- Wide selection of boundary conditions
- Acoustic-structural coupling
- Robust BEM formulations: Collocation, Variational, Burton-Miller Galerkin
- Multidomain implementation
- Scripting and Batch mode support
- Automatic creation of jumps & junction constraints
- Acoustic sources built-in

## Fast Multipole Method (FMM)

FMM is an efficient way to compute the far field caused by a collection of acoustic sources. A set of closely located sources are grouped together as a single multipole source, for computing far field response. The far field response is then expanded to obtain responses at nearby points. This powerful idea has been used in a number of disciplines from gravitation to elasticity. Coustyx integrates FMM with Boundary Element Method (BEM) to obtain rapid solutions to acoustic problems. The small memory foot print of Coustyx along with fast solvers allows us to solve large acoustic problems.



Direct computation - $O(N_2)$          FMM - $O(N\log N)$
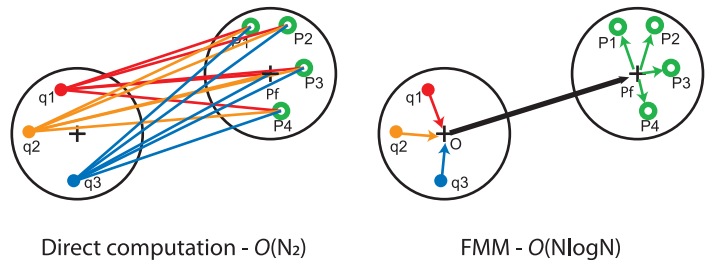
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## Fast Multipole Acoustics

### Next Generation Acoustic Analysis Software

## Benchmarks

| Problem Size | Memory Required | Solution Time |
|---|---|---|
| 10 K | 159 MB | 6 Sec |
| 20 K | 575 MB | 11 Sec |
| 50 K | 968 MB | 19 Sec |
| 100 K | 1.8 GB | 31 Sec |
| 200 K | 3.6 GB | 1.2 Min |
| 500 K | 8.6 GB | 3.0 Min |

Hardware specs: Intel Xeon Quad Core CPU X5550@2.67GHz

## ISO Standards Supported

| Standards | Description | Measurement Surfaces |
|---|---|---|
| ISO 3744 (1994 standard) | • Engineering grade<br>• Uses sound pressure levels | • Hemisphere, Quadrant, Octant<br>• Parallelepiped |
| ISO 3745 (2003 standard) | • Precision grade<br>• Uses sound pressure levels | • Sphere<br>• Hemisphere |
| ISO 9614-1 (1993(E) standard) | • Precision, Engineering & Survey grades<br>• Uses normal sound intensity | • Hemisphere<br>• Parallelepiped |

## Technical Support & Training

- Comprehensive user guide
- Training videos
- Tutorials
- Extensive suite of validation examples
- Context sensitive help from GUI
- Web resources
- Responsive technical support
- On-site/Online training sessions

## Licensing

- Operating system: Windows 7, Vista, XP, Linux
- 32-bit or 64-bit versions
- Network/Node-locked license
- Multi-core support

## Contact

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