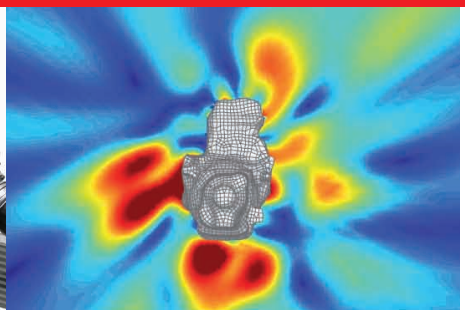
Actran Acoustics

The most efficient solution for predicting acoustic radiation



Product overview

Rich and powerful acoustic features for your simulation needs

Actran Acoustics contains a wide set of acoustic modeling features making it the CAE tool of choice for the simulation of a large variety of problems, from the simplest components to the most elaborate systems. Sound fields in cavities are accurately and efficiently analyzed with Actran Acoustics in both modal and physical approaches. Absorbing walls may be modeled in detail using impedance conditions or porous material models having fluid equivalent properties.

Actran Acoustics is uniquely suited for sound radiation analysis, where it brings unprecedented efficiency, speed and productivity to your analysis process. Actran Acoustics features an innovative adaptive meshing technology allowing the efficient computation of the acoustic radiation with users' minimal meshing efforts. Actran Acoustics is interfaced with most FEA structural analysis codes such as MSC Nastran, ABAQUS™ or ANSYS™. The sound radiation from vibrating structure into far field is accurately predicted using Free Field Technologies' exclusive, powerful and robust acoustic finite and infinite element libraries. The APML (Adaptive Perfectly Matched Layer) technology complements the infinite element technology, especially for dealing with larger problems at higher frequencies. RADACT, an integrated chain utility, allows engineers to streamline an automated sound radiation process and visualize meaningful results such as structure panel contribution and mode contribution.

Actran Acoustics offers powerful features for analyzing sound propagation in ducts at both component level (e.g. muffler volume) and system level (e.g. entire intake/exhaust lines). Engineers could rely on Actran for designing intake and exhaust lines or air distribution systems in buildings and aircrafts.

Among the many advanced features available in Actran Acoustics are the handling of a mean flow field (convected acoustic propagation) and temperature gradient effects. Specific elements are also available to handle visco-thermal effects that are important when sound waves propagates in narrow ducts or thin cavities (e.g.: hearing aids, solar array panels, etc.).

Target applications

- Sound radiation by vibrating structures: powertrain, engine components (oilpan, intake manifold, valve cover, etc.), compressors, electrical motors and more
- Sound produced by pulse signals: golf club, watch repeater, etc.
- Intake and exhaust noise, including air filters, complex mufflers, catalytic converters, etc.
- Air conditioning units and distribution systems (calculation of transfer matrices coefficients)
- Sound absorption inside passenger compartment of cars, trains and aircrafts
- Sound propagation in complex media with mean flow or temperature gradient
- Audio devices such as telephones, hearing aids or musical instruments

Key features

- Standard and convected acoustics
- Extraction of cavity modes
- Handling of heterogeneities such as complex flows or temperature gradients
- Account for dissipation mechanisms such as visco–thermal losses, acoustic absorption...
- Direct response and modal superposition approaches
- Adaptive meshing capabilities
- Unique library of stable infinite elements for modeling anechoic boundary conditions
- APML (Adaptive Perfectly Match Layer)
- Pressure, velocity and admittance boundary conditions
- Plane, spherical and cylindrical wave sources and excitation of ducts by incident plane waves
- Retrieving vibration results from most FEA structural analysis solvers
- TMM (Transfer Matrix Method) for analyzing and optimizing entire intake/exhaust lines
- RADACT utility for automation of the analysis process of acoustic radiation
- Direct and iterative solvers for reduced CPU times
- Krylov solver for fast frequency response analysis
- Available platforms: Windows and Linux 64 bits and most of Unix platforms
- Integration in Actran VI

Actran™

Actran Acoustics

Actran software suite

Actran is a complete acoustic, vibro–acoustic and aero–acoustic CAE software suite.
Empowered by the technologies of finite/infinite element methods (FE/IFE), as well as the Discontinuous Galerkin Method (DGM), Actran provides a rich library of materials, elements, boundary conditions, solution schemes and solvers. Actran is a high accuracy, high performance and high productivity modeling tool suiting the needs of the most demanding engineers, researchers, teachers and students for solving the most challenging acoustic problems.

Free Field Technologies (FFT)

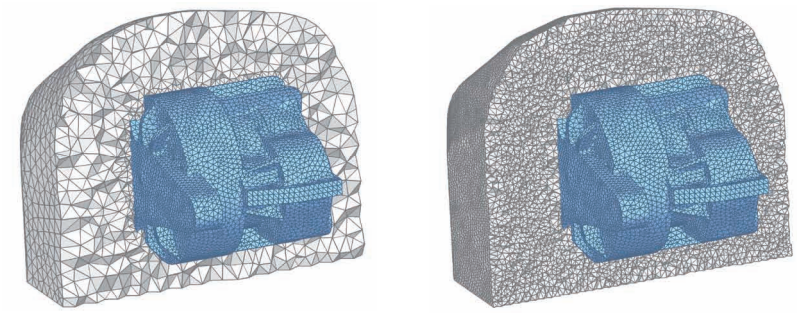
Free Field Technologies is focused on three main areas:

- Developing Actran software for acoustic, aero–acoustic and vibro–acoustic simulation;
- Providing technical services, support, training and delivering acoustic engineering projects;
- Researching innovative technologies and methods for efficient and accurate acoustic analysis.

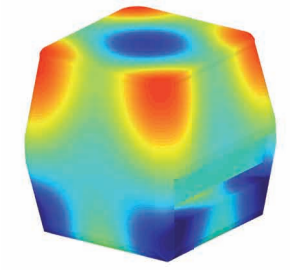
Free Field Technologies is the technical leader in acoustic CAE and with a wide range of customers around the world active in the Automotive, Aerospace, Shipbuilding, Electronic and Heavy Equipment industries as well as in the Educational and Research sectors.

FFT is a wholly owned subsidiary of MSC Software Corporation.

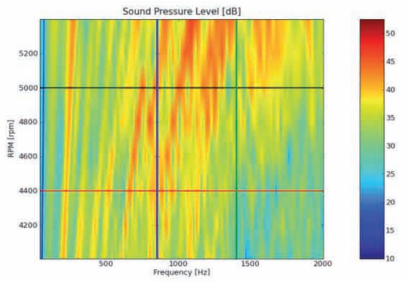
www.fft.be



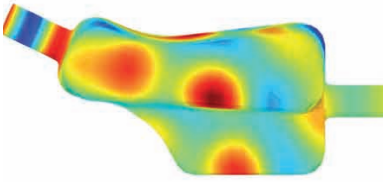
Adaptive meshing: automatic mesh generation optimized for specific computational frequencies



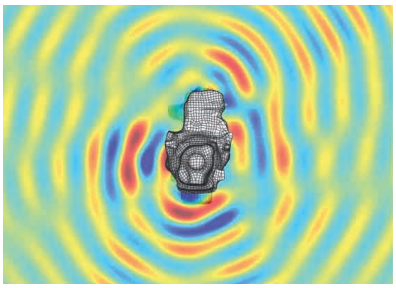
Acoustic mode of an air cavity



Waterfall diagram of the sound pressure level as a function of frequency and engine RPM



Pressure distribution in an exhaust muffler, where temperature gradients and mean flow are taken into account



Pressure field generated by a powertrain, whose vibration was calculated by MSC Nastran

View Actran videos on YouTube

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