MNOISE software

MODAL NOISE ANALYSIS

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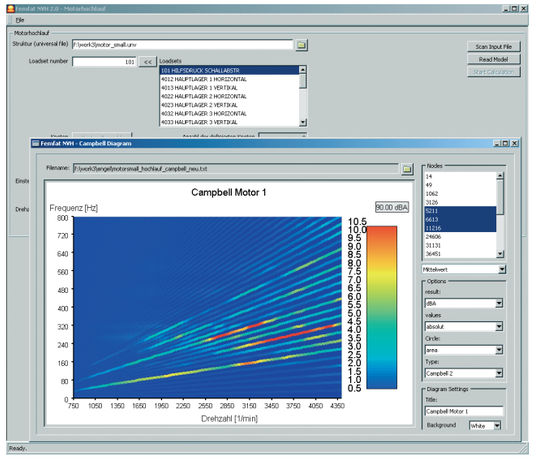
MNOISE Modules

MNOISE basic

MNOISE basic module includes all pre- and post-processing capabilities necessary for virtual acoustic evaluation of your component based on FE frequency response results. Acoustic measures of the near field are analyzed and clearly displayed. With MNOISE basic module one can detect critical areas and acoustic hotspots of the virtual component, which can be used as starting point for design improvements.



MNOISE gear

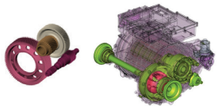
MNOISE gear module is a multi-body solver especially designed to solve the parametric excitation resulting from the mesh stiffness variation of spur gears.

The necessary information of the mesh stiffness can be imported directly from KISSsoft.

MNOISE gear solves the equation of motion of the spur gears and exports the run-up load tables for a subsequent FE response analysis.

The acoustic behavior of mesh excitation is especially important for the evaluation of transmission units and eDrive systems.

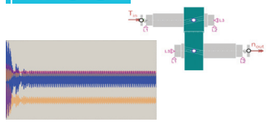
Gearing Data



KISSSOFT

Gear Forces

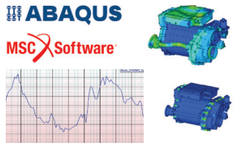
MNOISE



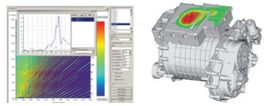
Surface Information

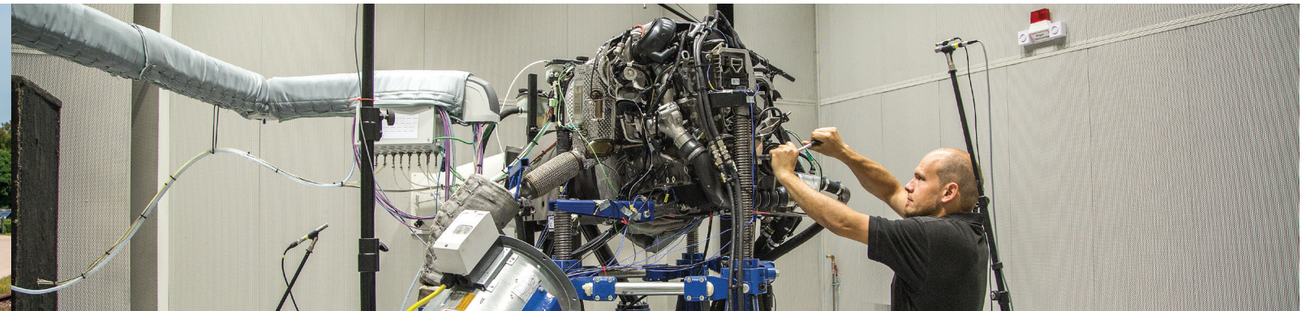
ABAQUS

MSC Software



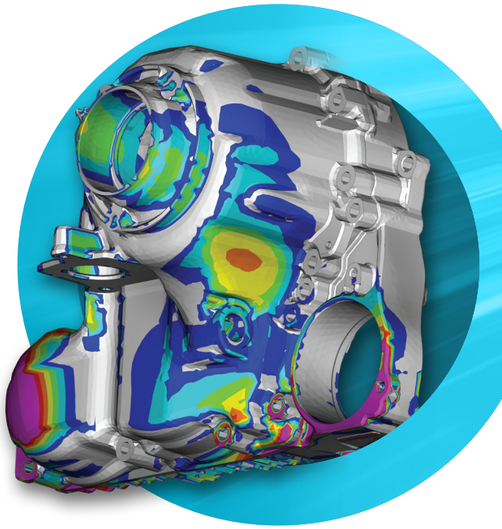
MNOISE





MNOISE software

:BY MAGNA POWERTRAIN



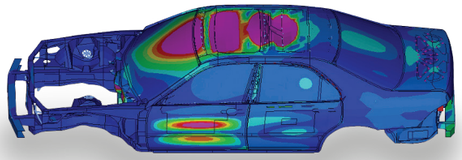
Modal Noise Analysis

Acoustic Simulation Postprocessor

mnoise.magna.com

Overview

MNOISE – A pre- and post-processing tool for acoustic simulations. MNOISE supports the engineer at the acoustic evaluation of components based on Finite Element (FE) simulations. In the pre-processing mode MNOISE automatically generates load data tables and calls the subsequent FE analysis. After finishing the FE analysis MNOISE collects the simulation results and evaluates acoustic measures in the post-processing mode. Acoustic hotspots can be detected and critical areas can be identified for further improvement.



Purpose

The acoustic requirements of automotive components have drastically increased in importance over the recent years due to legal regulations, lightweight design and higher customer demands. To shorten design phases it is necessary to evaluate the acoustic behavior already in the concept phase and/or in very early design phases using CAE methods. Using MNOISE critical areas and acoustic hotspots can be detected on the virtual component by evaluating acoustic near field measures. Based on these results, design improvements can be done.

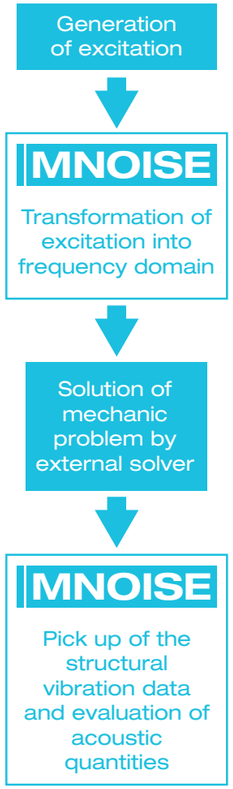
Method

The acoustic evaluation of the virtual component is carried out in a modal frequency response analysis based on Finite Element method. Using the frequency domain has the advantage that transient start-up effects do not interfere with the frequency response solution.

For the generation of the load data tables in frequency domain the engineer can use the pre-processing capabilities of MNOISE. Especially the interface to MSC Adams request file format for reading complex load data series simplifies the data transfer to the FE solver.

Additionally an ASCII interface allows the load data generation from arbitrary source. After finishing the FE simulations MNOISE can be used for evaluation of acoustic quantities in the near field of the analyzed component:

- Mean square of surface normal velocities (called mobility) over frequency for each surface
- Mean noise levels (near field sound pressure in dB or dB(A)) over frequency for each surface
- Acoustic power (in dB or dB(A)) over frequency for each surface
- Acoustic power - or noise level - distribution of frequency bands
- Campbell diagrams of acoustic power or noise levels for each surface
- Campbell diagrams of individual points (structure borne noise evaluation)



Excitation

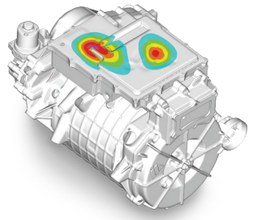
- Bearing forces from multi body simulation (engine run-up)
- Electromagnetic forces
- Gear forces
- Forces of the power train acting on the body (powertrain run-up)

External solver

- NASTRAN and ABAQUS is supported
- Solution via modal reduced frequency response analysis

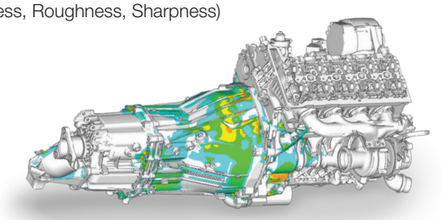
Acoustic evaluation

- Transformation of normal velocity into acoustic quantities (sound pressure level, loudness, …)



Your Benefits

- Automatic generation of load tables for Finite Element solver based on complex load histories from MBS run-up simulations
- Meshing forces of spur gear train
- Computation of acoustic parameters (surface noise level, acoustic power, mobility)
- Fourier transformation to prepare load data for the frequency response analysis
- Evaluation of the acoustic performance of components
- Detection of critical speeds and/or resonance frequencies (order cut, speed cut, frequency band evaluation)
- Psychoacoustic measures for individual points (Loudness, Roughness, Sharpness)



Applications

MNOISE can be used in a wide range of applications. Typical applications are the acoustic evaluation of

- Combustion engines
- eDrive systems
- Gearbox acoustic and transmission acoustic
- Vehicle body NVH