

Incredibly efficiently



Electric Drive Acoustics inside ANSYS

CADFEM ANSYS extension for calculating electric motor noise.

From vibration excitation to noise level

With the increasing presence of electric drives, noise levels are increasingly scrutinised. This is where the CADFEM Engineering Tool Electric Drive Acoustics inside ANSYS comes in. It was specially designed to simulate electrical motor noise. It calculates noise power from the surface vibration of the housing, which is caused by internal magnetic excitations.

Advantages

- seamless workflow
- Dynamic air-gap forces from precise FEM simulations
- Semi-automated transfer of air-gap forces on mechanical FEM model for standard motor geometry
- Efficient FEM vibration analysis over speed ranges with numerous speed frequency points
- Calculation of structure-borne noise level (ERP - equivalent radiated power) according to machine-acoustic equation
- Visualization in the waterfall diagram
- Identification of acoustically active orders, eigenmodes and housing surface areas

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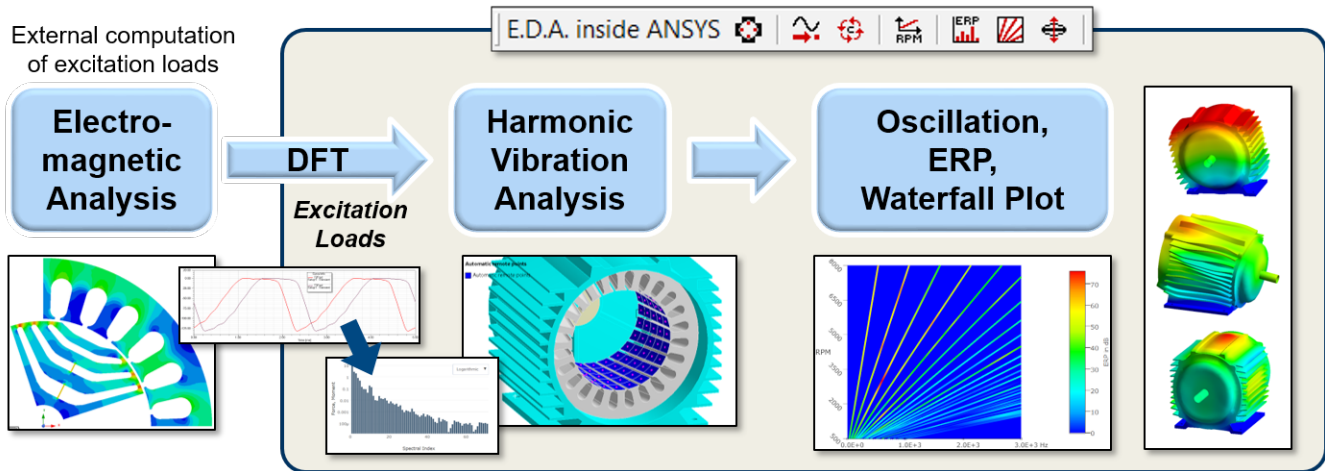
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Tools for the typical analysis steps

Electric Drive Acoustics inside ANSYS provides additional functions for dynamic analysis in ANSYS Mechanical. The oscillating air gap forces on the stator teeth are imported as excitations coming from a transient electromagnetic FEM computation of the machine. For their conversion from the time domain to the frequency domain, a Fourier transform is automatically executed inside. The import of the time-dependent excitation data offers various options and thus also takes into account different procedures for the generation of the data. Dedicated functions also distribute imported excitation loads on the stator teeth and reduce manual work to a minimum.

The vibration calculation is performed with a harmonic analysis using modal superposition. It allows the sweep over a speed range, in which the excitations can vary depending on the operating point. The equivalent radiated power is determined using the modal amplitudes – a method which is very efficient in terms of time and storage. The ERP results are displayed for the speed range in the waterfall or Campbell diagram.

Technical information

Prerequisite: ANSYS Workbench in the licensing from Version 19.1.

www.cadferm.de/extensions

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ANSYS

ANSYS is the world's largest provider of simulation software, and offers programs for almost any application. ANSYS is one of the most often used CAE solutions in industry, research and education.

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