PAK TOOLBOX E-NVH

SOLVE THE PROBLEMS SPECIFIC TO ELECTRIC AND HYBRID VEHICLES

Indeed, the architecture of electric powertrains requires a thorough knowledge of the sources of electrical excitation. Additional noise sources, specific to electric motors, related to their power supply and transmission systems, must be studied. The higher speeds of rotation, in particular cause noises and vibrations at higher frequencies.

A COMPREHENSIVE APPROACH

The dedicated PAK toolbox e-NVH helps engineers to interpret these phenomena of electrical origin, for example by distinguishing between orders caused by mechanical or by electrical excitation. This decomposition accurately extracts the orders in amplitude and phase and facilitates their location.

The analysis of the noise of electromagnetic origin, intrinsic to the operation of the various elements of the electrical system, is also essential. The Variable Speed Drive (VSD) system using the PWM control produces orders which modulate the PWM signal and its harmonics. Thus, can be seen as characteristic lines in the spectrum.

PAK's Pulse Width Modulation tool allows you to analyze this type of noise that is close to whistling but highly unpleasant for the user.

As for the mechanical and aerodynamic noise generated by the secondary sources (transmission, power steering, air conditioning / heating, oil / water pump, etc.) that become more noticeable since the engine and the exhaust system mask them less, the PAK software allows to measure and analyze them with great efficiency (Fourier analysis, Nth Octave Analysis, Order Analysis by resampling, ODS, Acoustic Intensity, Virtual Channels, Arithmetic, ...).

In particular, the Operational Transfer Path Analysis (OTPA) is a useful tool to quickly and accurately calculate and rank the effective contributions of individual sources by only using operational measurements.

AT A GLANCE

» Support of sensors which are already applied to e-engines, e.g. resolver, encoder

» Highly accurate calculation of the speed and angular position of the rotor

» Creation of PWM frequencies by various approaches, e.g. manual selection, correlated to rpm, direct input or measuring during recording

» Orders from frequency spectra and digital order tracking can both be visualized individually or summed-up (also across order fans) to quantify the PWM influence
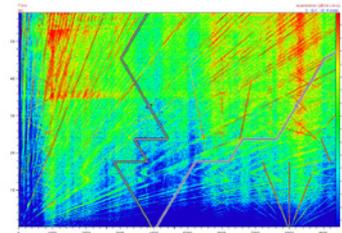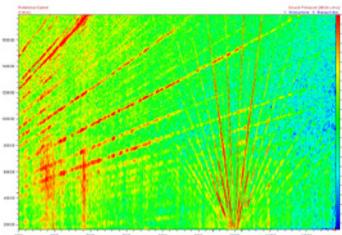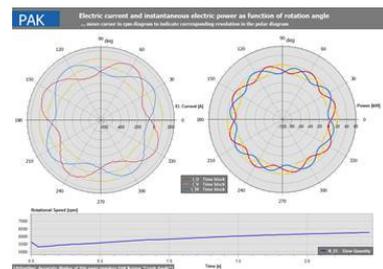
MÜLLER-BBM
VibroAkustik Systeme