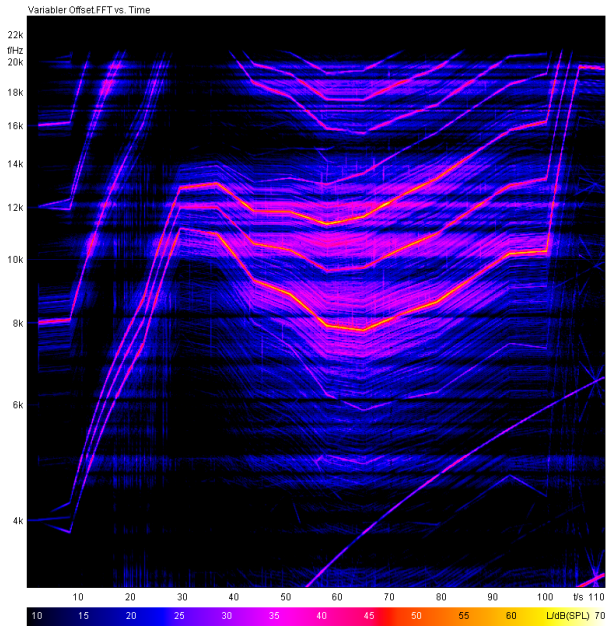
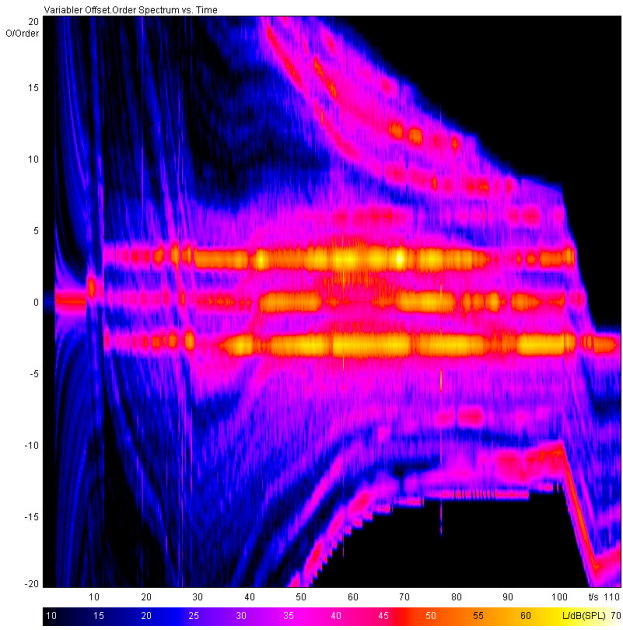
HEAD acoustics

DATA SHEET





ArtemiS SUITE
Signal Processing

Code 51006

ASP 006
Order Analysis

Order Analysis of ArtemiS SUITE provides analyses with several order algorithms for the calculation of sounds containing different signal components induced by a common control parameter.

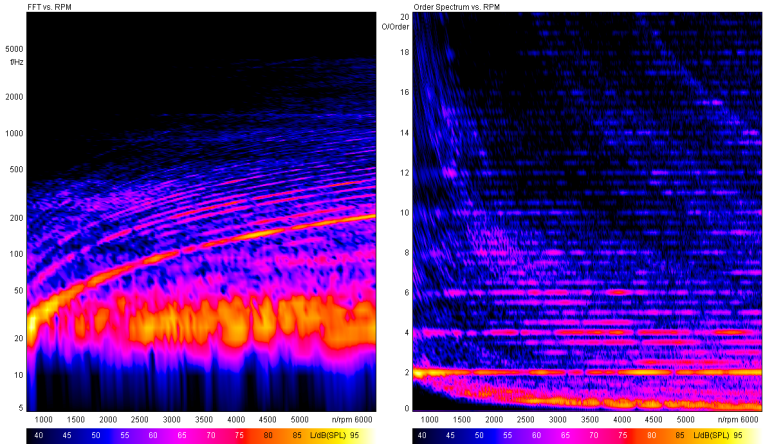
OVERVIEW

ASP 006
Order Analysis

Code 51006

Order Analysis provides analyses to examine the dependency of a noise on the rotational speed of an engine, for example, and to calculate the level or the level curve of the orders. For example, when examining electric motors, certain frequency components can instead occur that depend not only on the revolution speed, but also on a fixed or even variable frequency.

ASP 06 provides three different algorithms to calculate an order analysis: Using Variable DFT Size, the window length of the analysis varies with the engine speed. Using RPM-sync. Resampling, sampling is performed in equidistant rotation angle steps. Using Time Domain Averaging, signal sections are averaged vs. rotation angle with identical phasing in time domain.



KEY FEATURES

Order Analysis includes several order analyses:

- Order Spectrum
  - Determination of the quadratic mean value from all calculated short time spectra for each order
- Order Spectrum vs. Time
  - Determination of the orders of the revolution speed versus time
- Order Spectrum vs. RPM
  - Calculation of the order spectrum of the input signal versus a reference quantity
- Order Spectrum (peak hold)
  - Determination of the peak value from all calculated short time spectra for each order
- Time Signal vs. Rotation
  - Sampling of the input signal with a constant rotation step and display of the result versus a rotation axis

Calculation algorithms:

- Variable DFT Size
- RPM-sync. Resampling
- Time Domain Averaging

The analyses can be used in Pool Projects (APR 010 is required), Automation Projects (APR 050 is required), Standardized Test Projects (APR 220 is required), and Metric Projects (APR 570 is required)

APPLICATIONS

- Examination of periodic oscillations
- Examination of electric motors
- ...

Calculation algorithms

VARIABLE DFT SIZE

For an Order Spectrum vs. RPM analysis, for example, the time-domain signal is analyzed selectively at certain positions separated by constant revolution speed intervals.

The analysis results of all RPM sampling points are displayed in a three-dimensional diagram. The result is a spectrogram, where the level values are color-coded.

This algorithm is well suited for recordings where the rotational speed does not change too rapidly.

RPM-SYNC. RESAMPLING

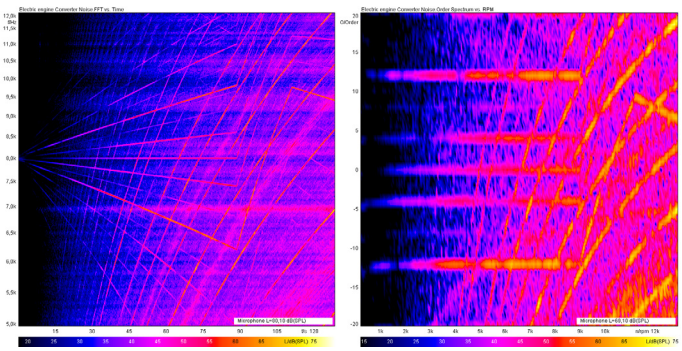
The RPM synchronous algorithm is particularly suitable for data where the rotational speed changes very rapidly and delivers precise unsmeared data.

The RPM-synchronous resampling is especially well suited for recordings with rapid RPM changes, a high resolution of orders, and an analysis of high orders. In this algorithm, a sampling rate conversion of the signal is performed first, so that the signal is no longer sampled in equidistant time intervals, but in equidistant rotation angle intervals (“resampling” of the signal).

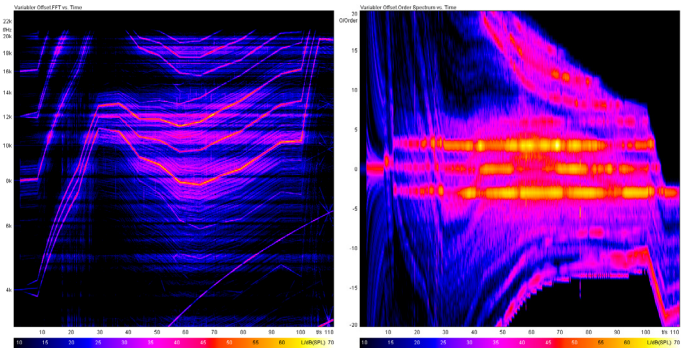
TIME DOMAIN AVERAGING

The time domain averaging algorithm applies RPM-synchronous sampling rate conversion as well. In addition, this algorithm averages signal sections with the same phasing in the time domain versus the angle of rotation. This allows signal components that are not synchronous to the RPM orders to be increasingly suppressed with increasing averaging time.

In the averaged order analysis, time domain averaging is applied across the entire signal curve. In an order analysis versus RPM or time, averaging only takes place across the signal section corresponding to the configured step size.



Electric engine converter: FFT vs. Time, Order Spectrum vs. RPM



Variable Offset: FFT vs. Time, Order Spectrum vs. Time

Required: APR Framework (Code 50000)

and/or: HEAD System Integration and Extension (ASX) programming interfaces

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