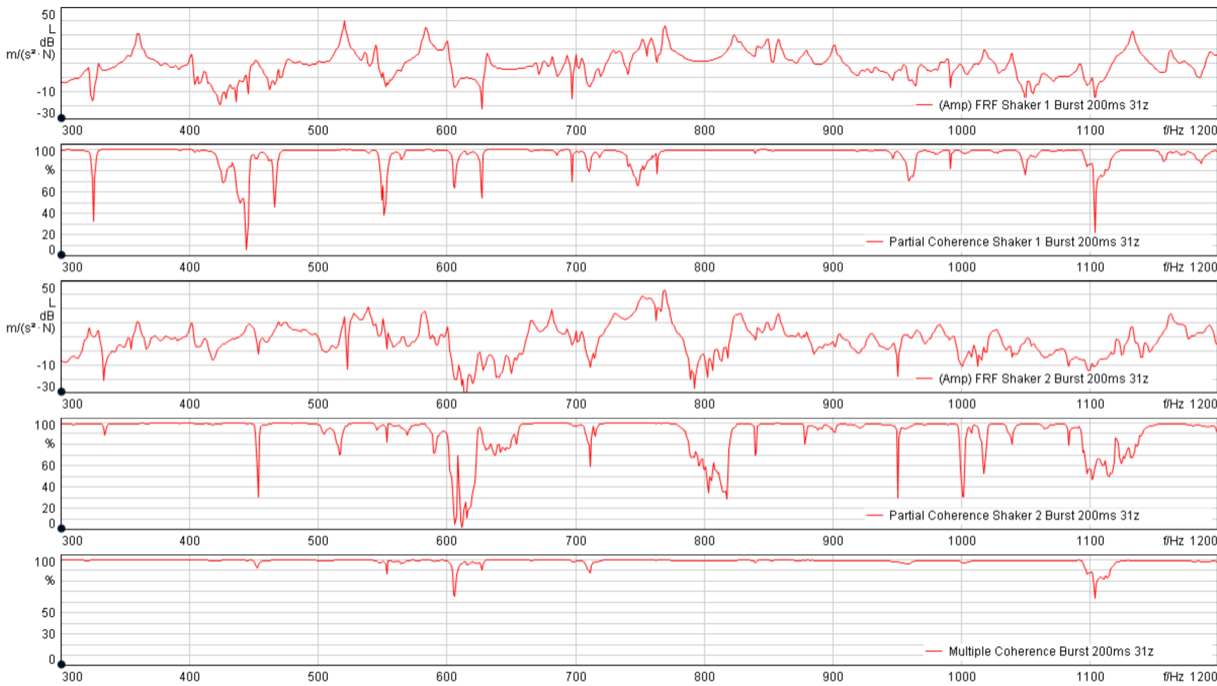
DATA SHEET



ArtemiS SUITE
Signal Processing

Code 51201

ASP 201
System Analysis

System Analysis of ArtemiS SUITE provides analyses for gathering findings about the dynamic system characteristics of various objects.

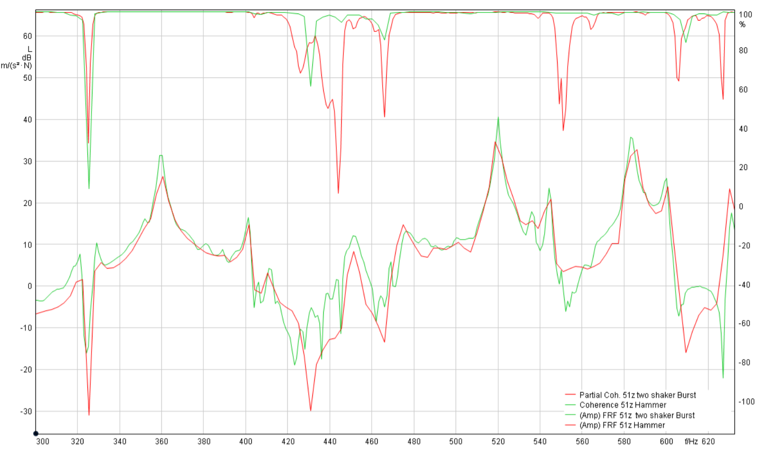
OVERVIEW

ASP 201
System Analysis

Code 51201

An analysis of the signal paths can yield information about the dynamic system characteristics of a wide range of objects.

System Analysis provides tools for system analysis: Transfer Function, Impulse Response, Coherence (partial and multiple Coherence for MIMO structural analysis), correlation, and other analyses.



KEY FEATURES

System Analysis includes several system analyses:

- Transfer Function, Transfer Function vs. Time
- Impulse Response, Impulse Response vs. Time
- Auto Correlation, Auto Correlation vs. Band, Auto Correlation vs. Time
- Cross Correlation, Cross Correlation vs. Band, Cross Correlation vs. Time
- Auto Spectrum, Auto Spectrum vs. Time
- Cross Spectrum, Cross Spectrum vs. Time
- Coherence, Coherence vs. Time
- Coherent Spectrum
- Multiple Coherence, Multiple Coherent Spectrum
- Partial Coherence, Partial Coherent Spectrum
- Harmonic Distortion, Harmonic Distortion vs. Time, Harmonic Distortion vs. Frequency

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 the dynamic system characteristics
- ...

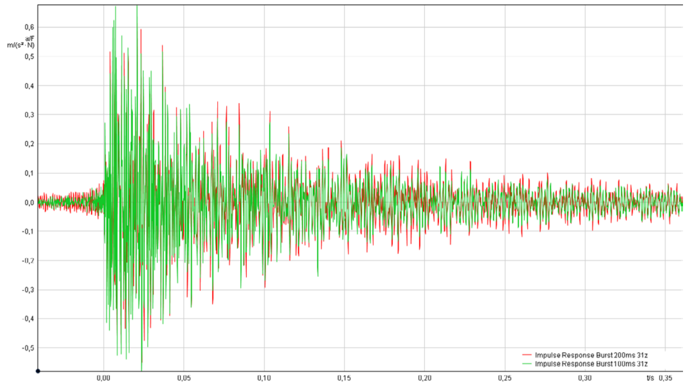
DETAILS

Transfer function

The transfer function describes the dependency of the output on the input of a linear time-invariant system in the frequency domain.

The analysis Transfer Function calculates the transfer function from two channels of the input signal or from the input signal and a reference signal.

The analysis Transfer Function vs. Time calculates the transfer function versus the time.



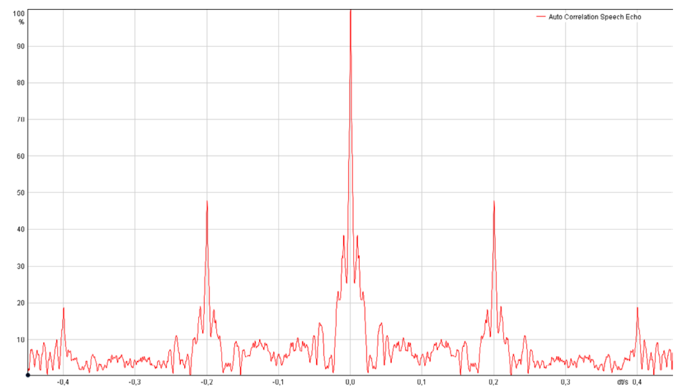
Impulse Response

Impulse response

The impulse response describes the transfer function in the time domain with the help of the response to the elementary signal "impulse". This analysis is used to examine the similarity of a signal with equally long parts of a reference signal in the time domain.

The analysis Impulse Response calculates the impulse response from two channels of the input signal or from the input signal and a reference signal.

The analysis Impulse Response vs. Time calculates the impulse response versus the time.



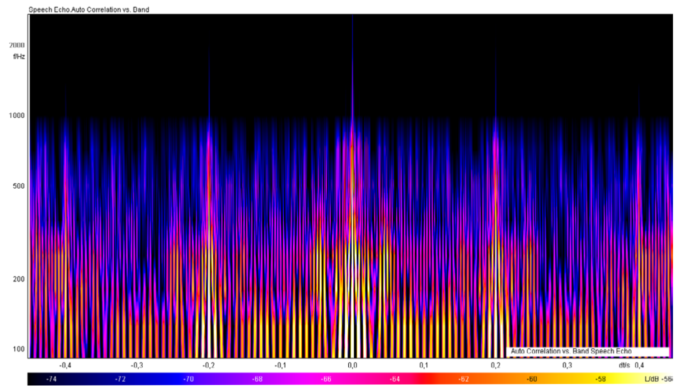
Auto Correlation

Correlation

The analysis Auto Correlation examines two input signals to find corresponding components and therefore shift the signals against each other. This analysis can used to calculate the self-similarity of a signal in the time domain, what makes them particularly suitable for detecting periodic signals or echoes, for example.

The analysis Auto Correlation vs. Band calculates the auto correlation function of an input signal versus the frequency bands.

The analysis Auto Correlation vs. Time calculates the auto correlation versus the time.



Auto Correlation vs. Band

The analysis Cross Correlation can be used to examine the similarity of a signal with equally long parts of a reference signal in the time domain. Therefore, a similarity value of two signal parts just like the auto correlation analysis is calculated. But while the latter examines two identical signals, the cross correlation analysis uses two different signals shifted to each other by a shift time.

The analysis Cross Correlation vs. Time calculates the cross correlation function of an input and a reference signal versus the time.

The analysis Cross Correlation vs. Band calculates the cross correlation function versus the frequency bands.

Auto spectrum

The analysis Auto Spectrum calculates the auto spectrum of an input signal.

The analysis Auto Spectrum vs. Time calculates the auto spectrum versus the time.

Cross spectrum

The analysis Cross Spectrum calculates the cross spectrum of an input and a reference signal.

The analysis Cross Spectrum vs. Time calculates the cross spectrum of an input and a reference signal versus the time.

Coherence

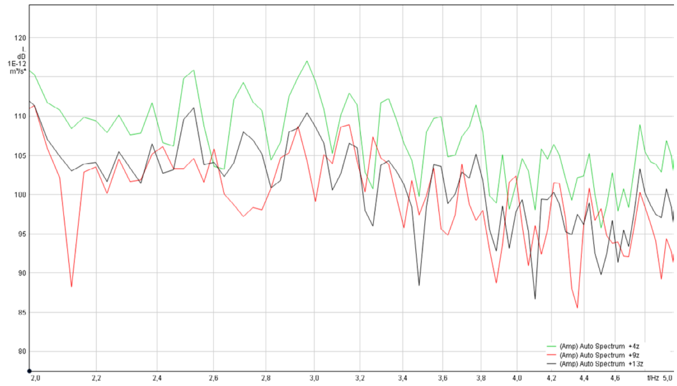
The analysis Coherence can be used to measure a linear dependency between two signals versus frequency and is represented as percentage value. The calculation is performed from auto spectrum and cross spectrum and the result is then plotted versus the frequency.

The analysis Coherence vs. Time calculates the coherence between two channels of the input signal or between the input signal and a reference signal versus the time.

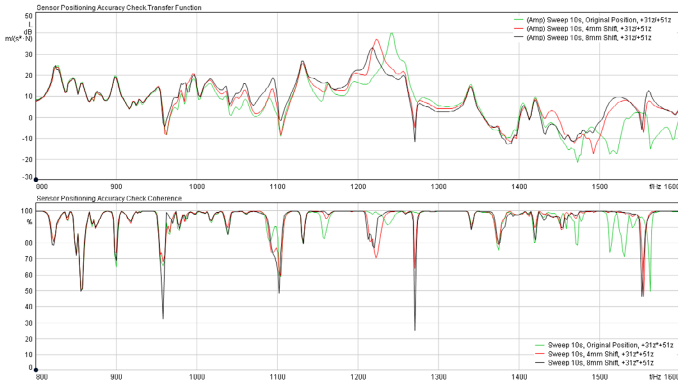
The analysis Coherent Spectrum is the product of the auto spectrum of the particular channel and the coherence. It indicates the amount of the spectrum that is coherent with the reference signal. Accordingly the multiple respectively partial coherent spectrum is calculated from the multiple respectively partial coherence.

The analysis Multiple Coherence is a measure of the linear dependency between an output and all input channels (reference channels). The calculation is based upon the auto spectrum of the output channel, the auto and cross spectra of the input channels, and the cross spectrum between the output channel and all input channels.

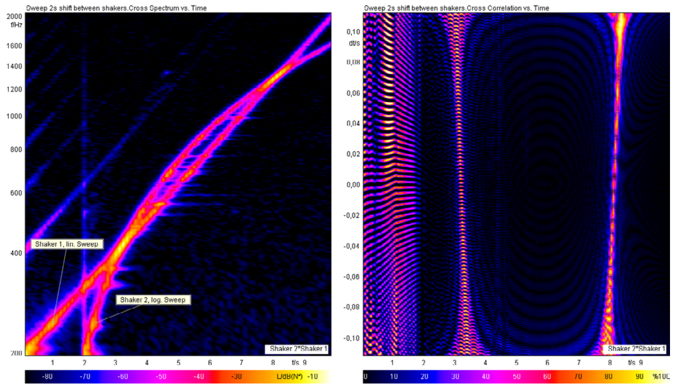
The analysis Multiple Coherent Spectrum calculates the coherent spectrum of an output and several input channels



Auto Spectrum



Transfer Function, Coherence



Cross Spectrum vs. Time, Cross Correlation vs. Time

The analysis Partial Coherence can be considered the same function as the normal coherence – a measure for the linear dependency between two channels – but with an additional aspect: The linear influence of other (input) channels can be removed from the actual output channel as well as from the input (reference) channel.

The analysis Partial Coherent Spectrum calculates the coherent spectrum of two channels of an input signal whereby the linear influence of other (input) channels can be removed

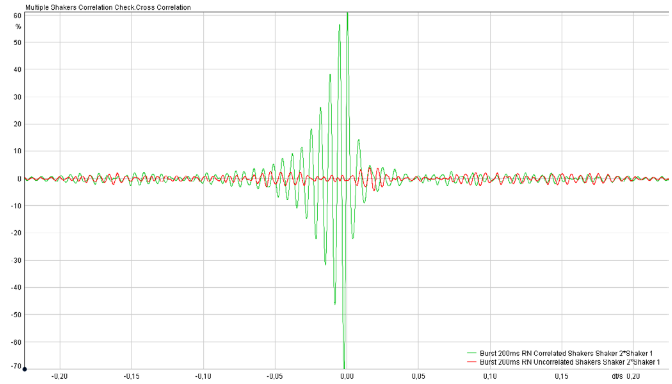
Harmonic distortion

The harmonic distortion represents the degree of nonlinear distortion of a signal during a transmission. To measure the nonlinear distortion, a sine signal is sent across the transmission chain and afterwards the output signal is related to the original signal. A differentiation is made between harmonic distortions, which are usually caused by over-modulation of the signal, and noise.

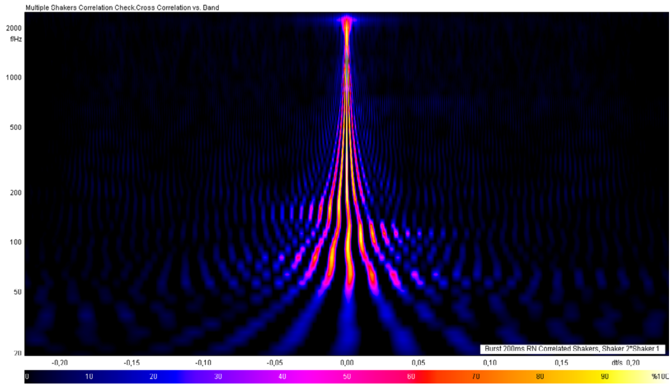
The analysis Harmonic Distortion calculates the harmonic distortion of an input signal. As visual result of this analysis, the power averaged spectrum is displayed as in the FFT (averaged) analysis. The actual result, however, are the single values calculated therefrom. Because of the averaging, this analysis is only suitable for stationary signals.

The analysis Harmonic Distortion vs. Time calculates the harmonic distortion of an input signal versus the time. Therefore, the particular harmonic distortion single value is calculated from the corresponding instant FFT spectrum for each point in time and displayed in the result diagram. As in contrast to the averaged harmonic distortion variant, no averaging is performed hereby this analysis is suitable for the analyzing of changing signals.

The analysis Harmonic Distortion vs. Frequency calculates the harmonic distortion of an input signal versus the frequency. The usage of it is suitable for measurements of sine sweep signals.



Cross Correlation



Cross Correlation vs. Band

Required: APR Framework (Code 50000)

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

HEAD acoustics

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