

ArtemiS SUITE
Signal Processing

Code 51005

ASP 005 Modulation Analysis

Modulation Analysis of ArtemiS SUITE provides the advanced analysis of modulated signals with regard to their frequency, strength, and change over time.

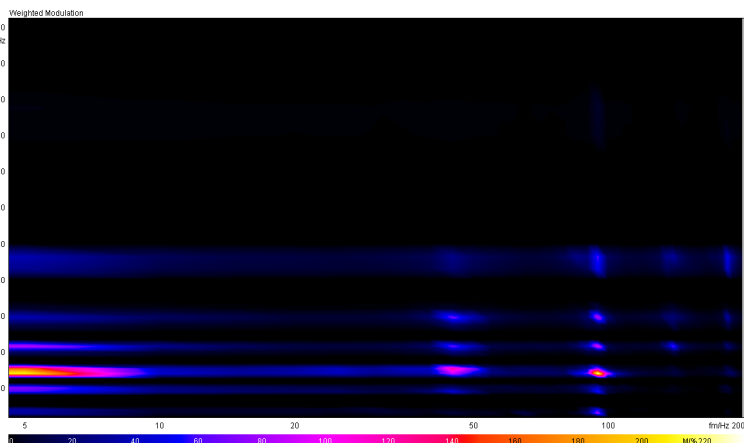
OVERVIEW

ASP 005 Modulation Analysis

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Modulation Analysis provides advanced analyses for the examination of amplitude modulations, which deliver the envelope spectra of partial bands of an analyzed signal. This allows to determine the frequency, strength and change over time of amplitude modulations in a signal.

While the psychoacoustic parameters roughness and fluctuation strength allow only certain modulation frequencies to be examined and at the same time judged, a modulation analysis covers a wider frequency range, which also includes the roughness and fluctuation strength areas, and does not add psychoacoustic weightings.



KEY FEATURES

Modulation Analysis includes several advanced analyses:

- › Modulation Frequency vs. Time / vs. RPM
 - › 2D analysis of the modulation frequency of a selectable frequency range vs. time or RPM
- › Modulation Spectrum
 - › 2D analysis of the average modulation factor of a selectable frequency range vs. the modulation frequency
- › Degree of Modulation vs. Time / vs. RPM
 - › 2D analysis of the degree of modulation of a selectable frequency range vs. time or RPM
- › Modulation Spectrum vs. Time / vs. RPM
 - › 3D analysis of the modulation factor of a selectable frequency range vs. time or RPM and the modulation frequency
- › Modulation Spectrum vs. Band
 - › 3D analysis of the modulation factor vs. the modulation and carrier frequency
- › Weighted Modulation Analysis
 - › 3D analysis of the annoyance of stationary signals

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

- › Analysis of amplitude- and frequency-modulated signal components

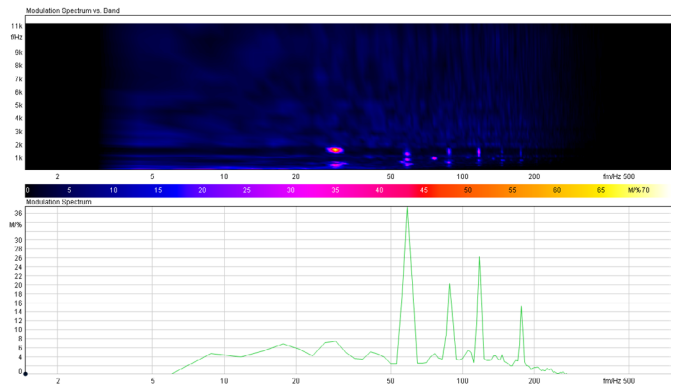
Modulation Analyses

If it is found that a signal is modulated, a Modulation Spectrum vs. Band analysis can be used. The result of this analysis provides an overview of the modulation frequencies in the entire frequency range. Furthermore, the degree of modulation is shown as well.

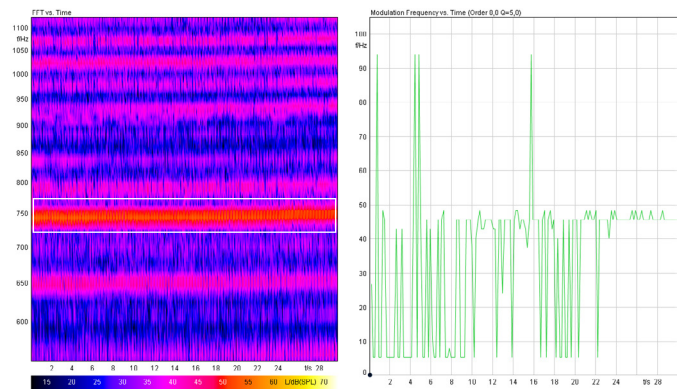
If the user already knows which signal frequency range might contain modulations, the Modulation Spectrum analysis is useful. This analysis determines the modulation factor and modulation frequency of a certain specified frequency range of the input signal. This analysis can be used, for example, for quality tests if a product has a known fault that expresses itself in modulations in a certain frequency range.

For analysis of signals that change rapidly over time, the time- or RPM-dependent analysis functions (Degree of Modulation vs. Time / vs. RPM, Modulation Frequency vs. Time / vs. RPM, Modulation Spectrum vs. Time / vs. RPM) are recommended. These methods can show variations of the modulation. One possible application is modulation analysis of a sound recording of an engine run-up. For the analysis of signals containing RPM information, it is useful to employ order filters rather than frequency-dependent filters. The filter type can be selected in the Properties window of the respective analysis.

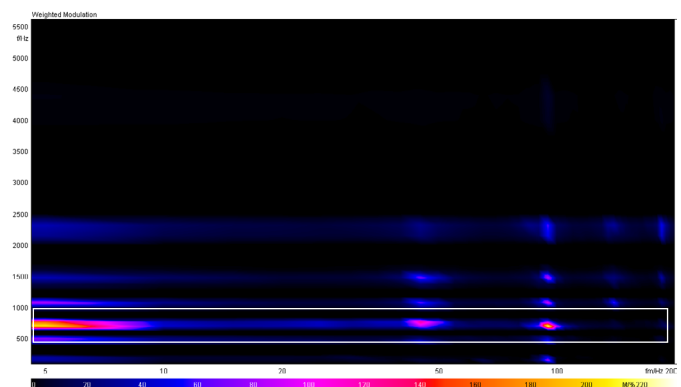
The weighted modulation spectrum examines the modulation of stationary sounds (e.g., power supply fan noise) and turns it into a single value as a measure of annoyance. For this purpose, the modulation spectrum of the frequency groups is calculated. Only modulation frequencies between 0 Hz and the configured maximum envelope frequency are taken into account. The result comprises the single value and the modulation spectrum plotted against the signal frequency.



Modulation Spectrum vs. Band, Modulation Spectrum



FFT vs. Time, Modulation Frequency vs. Time



Weighted Modulation

Required: APR Framework (Code 50000)
and/or: HEAD System Integration and Extension (ASX) programming interfaces



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