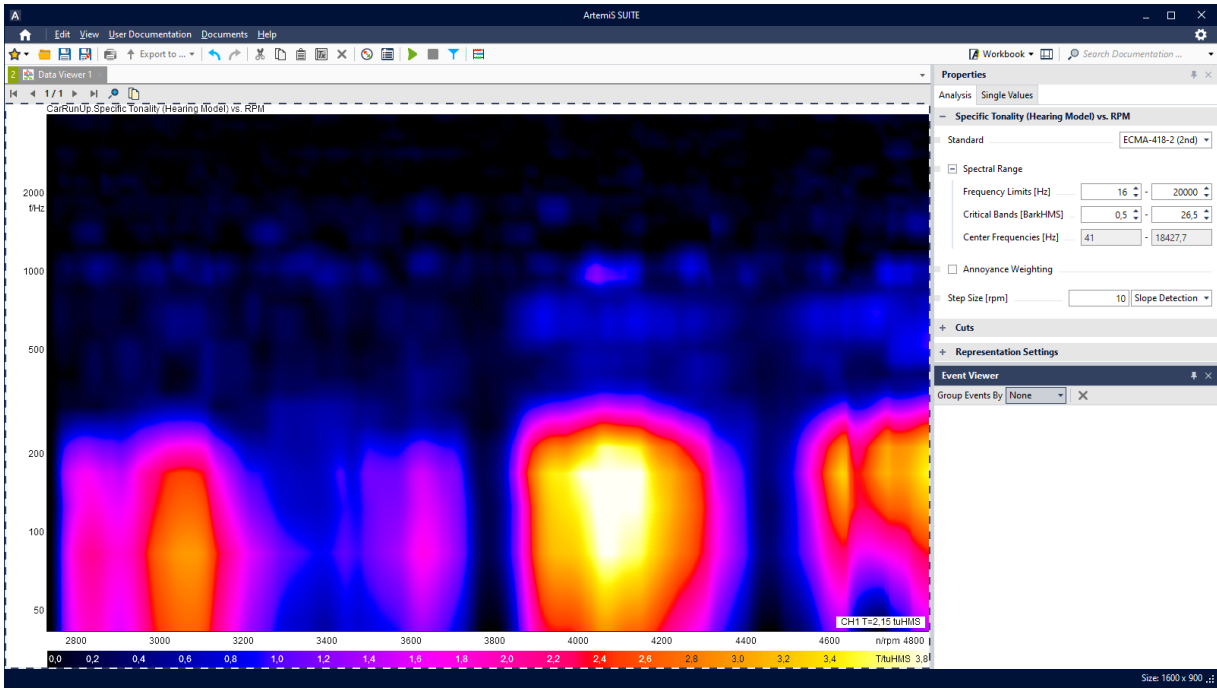
HEAD acoustics

DATA SHEET



ArtemiS SUITE
Signal Processing

Code 51104

ASP 104 Psychoacoustics - Advanced Analysis vs. Control Channel

ASP 104 of ArtemiS SUITE provides several sophisticated psychoacoustic analyses based upon the Sottek Hearing Model versus control channels (RPM, force, ...).

OVERVIEW

ASP 104 Psychoacoustics - Advanced Analysis vs. Control Channel

Code 51104

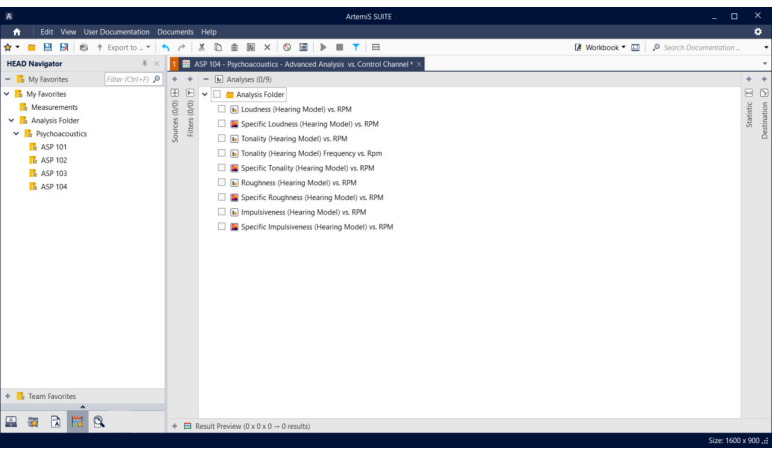
ASP 104 provides sophisticated analyses based upon the Sottek Hearing Model versus control channels.

ArtemiS SUITE offers further psychoacoustic analysis options:

ASP 103 (Psychoacoustics - Advanced Analysis),
ASP 101 (Psychoacoustics - Basic Analysis),
ASP 102 (Psychoacoustics - Basic Analysis vs. Control Channel)

› ASP 103 and 104 provide the standards:
DIN 38455, ECMA 418-2 (1st Edition) / (2nd Edition),
ECMA 74 (15th Edition) / (17th Edition)

› ASP 101 and 102 provide the standards standards and methods:
DIN 45631/A1, ISO 532-1, 532-3, ANSI S3.4-2007,
DIN 45681, Aures, von Bismarck, DIN 45692



KEY FEATURES

ASP 104 includes several Hearing Model analyses, which can be calculated versus RPM, force, temperature, or other control channels

› Loudness (Hearing Model) vs. RPM
› Specific Loudness (Hearing Model) vs. RPM
› Tonality (Hearing Model) vs. RPM
› Specific Tonality (Hearing Model) vs. RPM
› Tonality (Hearing Model) Frequency vs. RPM
› Roughness (Hearing Model) vs. RPM
› Specific Roughness (Hearing Model) vs. RPM
› Impulsiveness (Hearing Model) vs. RPM
› Specific Impulsiveness (Hearing Model) vs. RPM

The analyses are based upon the following standards:
› DIN 38455
› ECMA 418-2 (1st Edition) / (2nd Edition)
› ECMA 74 (15th Edition) / (17th Edition)

ASP 104 can be used in Pool Projects (require APR 010), Automation Projects (require APR 050), Standardized Test Projects (require APR 220), and Metric Projects (require APR 570)

APPLICATIONS

› Simulating human perception with suitable analyses
› Improving the sound quality of products
› Evaluation of environmental noise

OVERVIEW ASP 101 – ASP 104

PSYCHOACOUSTICS – BASIC ANALYSIS (ASP 101)

- Loudness vs. Time
- Specific Loudness
- Specific Loudness vs. Time
- Sharpness vs. Time
- Tonality DIN 45681
- Tonality DIN 45681 vs. Time
- Tone to Noise Ratio
- Tone to Noise Ratio vs. Time
- Specific Prominence Ratio
- Specific Prominence Ratio vs. Time
- Fluctuation Strength vs. Time
- Specific Fluctuation Strength
- Specific Fluctuation Strength vs. Time

PSYCHOACOUSTICS – ADVANCED ANALYSIS (ASP 103)

- Loudness (Hearing Model) vs. Time
- Specific Loudness (Hearing Model)
- Specific Loudness (Hearing Model) vs. Time
- Tonality (Hearing Model) vs. Time
- Specific Tonality (Hearing Model)
- Specific Tonality (Hearing Model) vs. Time
- Tonality (Hearing Model) Frequency vs. Time
- Roughness (Hearing Model) vs. Time
- Specific Roughness (Hearing Model)
- Specific Roughness (Hearing Model) vs. Time
- Impulsiveness (Hearing Model) vs. Time
- Specific Impulsiveness (Hearing Model)
- Specific Impulsiveness (Hearing Model) vs. Time
- Spectrum (Hearing Model) vs. Time
- Relative Approach 2D
- Relative Approach 3D

PSYCHOACOUSTICS – BASIC ANALYSIS VS. CONTROL CHANNEL (ASP 102)

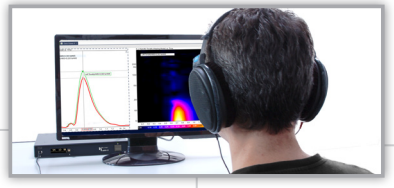
- Loudness vs. RPM
- Specific Loudness vs. RPM
- Sharpness vs. RPM
- Tonality DIN 45681 vs. RPM
- Tone to Noise Ratio vs. RPM
- Specific Prominence Ratio vs. RPM
- Fluctuation Strength vs. RPM
- Specific Fluctuation Strength vs. RPM

PSYCHOACOUSTICS – ADVANCED ANALYSIS VS. CONTROL CHANNEL (ASP 104)

- Loudness (Hearing Model) vs. RPM
- Specific Loudness (Hearing Model) vs. RPM
- Tonality (Hearing Model) vs. RPM
- Specific Tonality (Hearing Model) vs. RPM
- Tonality (Hearing Model) Frequency vs. RPM
- Roughness (Hearing Model) vs. RPM
- Specific Roughness (Hearing Model) vs. RPM
- Impulsiveness (Hearing Model) vs. RPM
- Specific Impulsiveness (Hearing Model) vs. RPM

STANDARDS

- Loudness
  - DIN 45631/A1
  - ISO 532-1, ISO 532-3
  - ANSI S3.4-2007 (FFT) / (FFT/3rd Oct)
- Sharpness
  - Aures
  - Von Bismarck
  - DIN 45692
  - DIN 45631/A1
  - ISO 532-1, ISO 532-3
  - ANSI S3.4-2007 (FFT) / (FFT/3rd Oct)
- Tonality
  - DIN 45681
- Loudness (Hearing Model)
  - ECMA 418-2 (2nd)
- Roughness (Hearing Model)
  - DIN 38455
  - ECMA 418-2 (1st) / (2nd)
- Tonality (Hearing Model)
  - ECMA 74 (15th) / (17th)
  - ECMA 418-2 (1st) / (2nd)



ARTEMIS SUITE PROJECTS

- Pool Project (APR 010)
- Automation Project (APR 050)
- Standardized Test Project (APR 220)
- Metric Project (APR 570)

Additional solutions from HEAD acoustics

JURY TESTING SOFTWARE SQALA

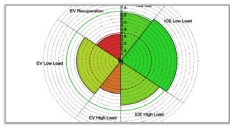
- Jury Testing - SQala Basic (APR 500)
- Jury Testing - SQala Net (APR 501)
- Jury Testing - SQala Server (APR 501)

BINAURAL MEASUREMENT AND PLAYBACK

- Artificial heads HMS V, HSU
- HEAD*lab* systems
- Mobile frontend SQuadriga III, ...
- ...

SOUND QUALITY INDEX

- Metric Project (APR 570)



DETAILS

Sottek Hearing Model

The human hearing outclasses every available technical systems in terms of performance and flexibility when it comes to sound analysis. To cover as many psychoacoustic phenomena in principle as possible, the Sottek Hearing Model based upon the physiology of the human ear was developed by HEAD acoustics to explain and describe psychoacoustic effects and basic auditory sensations.

The Sottek Hearing Model mainly consists of an ear-related time-frequency representation and is characterized in particular by its high correlation to the results of many psychoacoustic experiments. For example, just-perceptible amplitude and frequency variations can be predicted whereat the nonlinear processing has a fundamental meaning.

Loudness

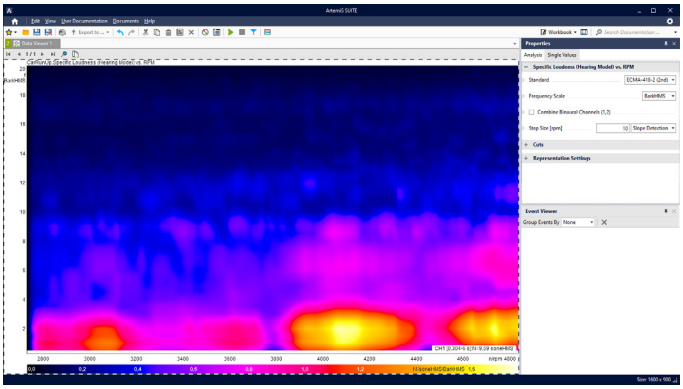
Loudness is the sensation value for the human perception of loudness. Since the loudness perception of the human auditory system is dependent on frequency, sound events with the same level but different frequency do not always evoke the same loudness perception in humans. Therefore, the loudness scale is characterized by the fact that a sound that is perceived as twice as loud also has a value that is twice as high on the loudness scale.

LOUDNESS (HEARING MODEL) VS. RPM

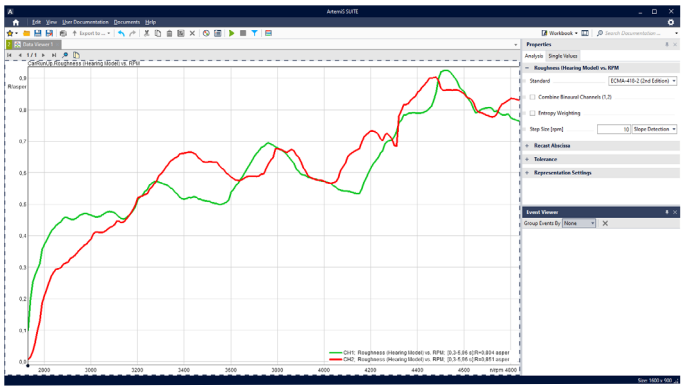
The analysis Loudness (Hearing Model) vs. RPM calculates the loudness of an input signal versus control channels. In particular, the calculation also takes the different perception of loudness of tonal and non-tonal noise components into account.

SPECIFIC LOUDNESS (HEARING MODEL) VS. RPM

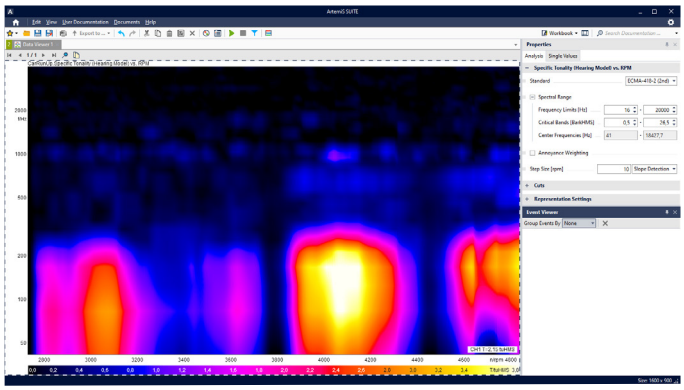
The analysis Specific Loudness (Hearing Model) calculates the specific loudness of an input signal versus control channels.



Specific Loudness (Hearing Model) vs. RPM



Roughness (Hearing Model) vs. RPM



Specific Tonality (Hearing Model) vs. RPM

Roughness

The impression of roughness occurs whenever a time-variant envelope exists within a critical band; for example, when tones exhibit a temporal structure due to a variation of their amplitude or frequency. The roughness depends on the center frequency, the modulation frequency, and the modulation depth. With increasing modulation depth, the impression of roughness becomes stronger. The signal level only has a small influence on the roughness impression

ROUGHNESS (HEARING MODEL) VS. RPM

The analysis Roughness (Hearing Model) vs. RPM calculates the roughness of the input signal versus control channels.

The roughness analysis is ideally suitable for evaluating technical products, such as electric and combustion engines as well as ITT (Information Technology and Telecommunications) products.

SPECIFIC ROUGHNESS (HEARING MODEL) VS. RPM

The analysis Specific Roughness (Hearing Model) RPM calculates the specific roughness of an input signal versus control channels.

Tonality

Sounds are perceived as tonal if they contain distinct individual tones or narrow-band noise. Undesired tonal noise is perceived as more annoying than comparable noise without tonal components. If a product or machine causes tonal noise components, this will have a negative effect on the perceived overall quality.

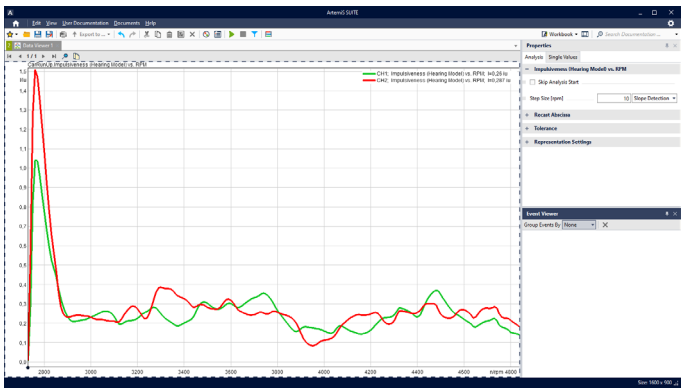
TONALITY (HEARING MODEL) VS. RPM

The analysis Tonality (Hearing Model) vs. RPM calculates the tonality of an input signal versus control channels. It is based on an improved Sottek Hearing Model which is characterized by a linear representation of human tonality perception, a good correlation with the results of jury tests, and a correct detection in case of sounds with quickly changing tonality.

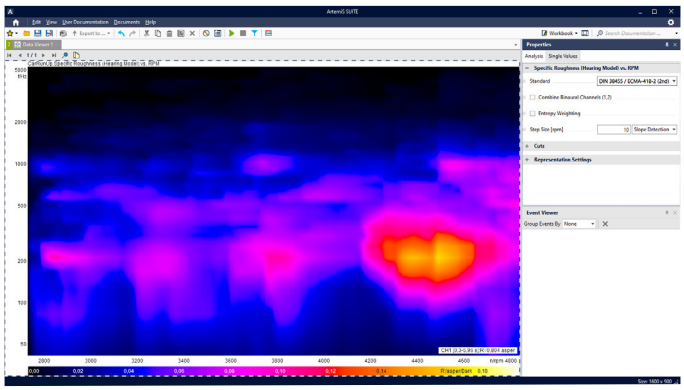
The analysis detects disturbing components, even in sounds with rapidly changing tonalities, such as electric motors or information technology. Furthermore, the analysis is ideal for detecting tonal sound components using a metric – for this, the Metric Project (APR 570) is available.

SPECIFIC TONALITY (HEARING MODEL) VS. RPM

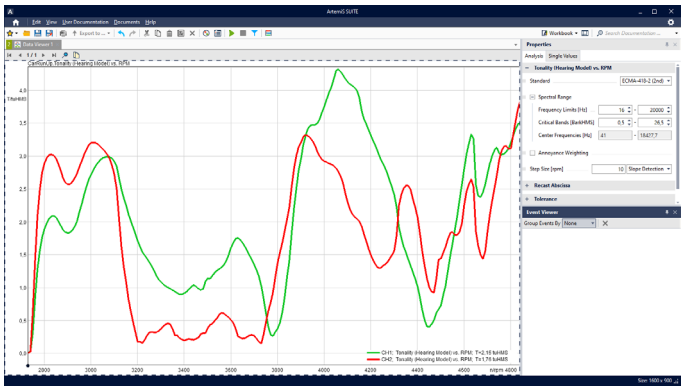
The analysis Specific Tonality (Hearing Model) vs. RPM calculates the specific tonality of an input signal versus control channels.



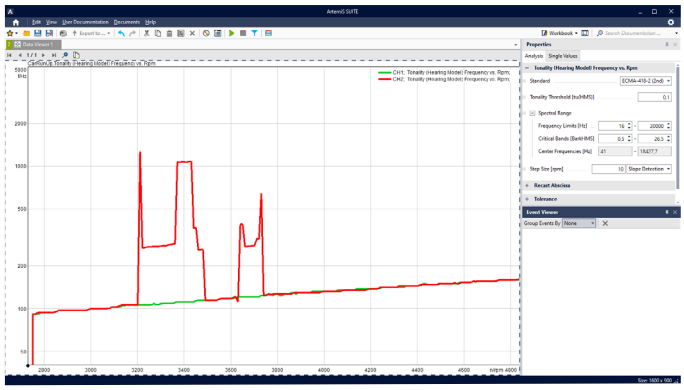
Loudness (Hearing Model) vs. RPM



Specific Roughness (Hearing Model) vs. RPM



Tonality (Hearing Model) vs. RPM



Tonality (Hearing Model) Frequency vs. RPM

TONALITY (HEARING MODEL) FREQUENCY VS. RPM

The analysis Tonality (Hearing Model) Frequency vs. RPM calculates the frequency of the highest tonality of an input signal versus control channels.

Impulsiveness

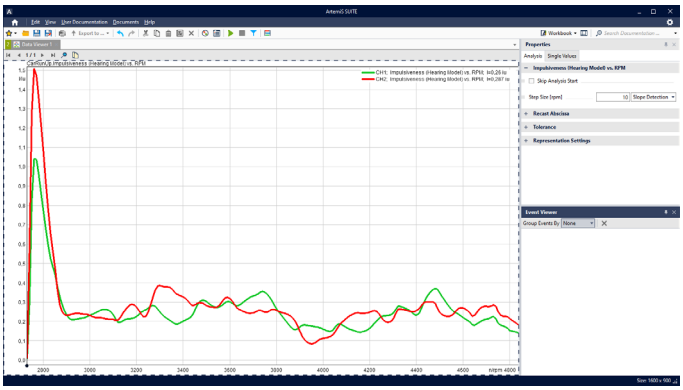
The sensation impulsiveness is generated by fast and huge signal level fluctuations. The impulsiveness analyses take this into account by mapping the human perception of fast and at the same time huge noise level changes to a linear scale.

IMPULSIVENESS (HEARING MODEL) VS. RPM

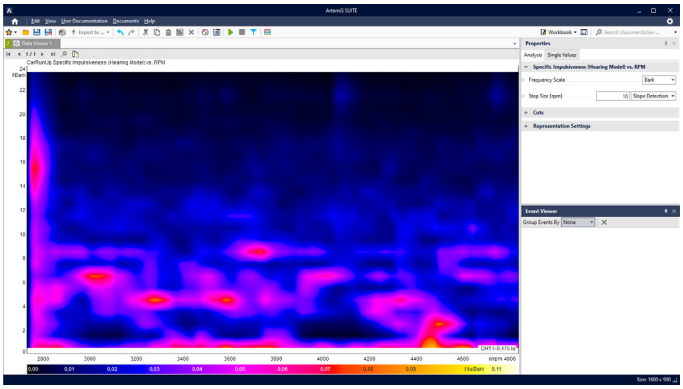
The analysis Impulsiveness (Hearing Model) vs. RPM calculates the impulsiveness of an input signal versus control channels.

SPECIFIC IMPULSIVENESS (HEARING MODEL) VS. RPM

The analysis Specific Impulsiveness (Hearing Model) vs. RPM calculates the specific impulsiveness of an input signal versus control channels.



Impulsiveness (Hearing Model) vs. RPM



Specific Impulsiveness (Hearing Model) vs. RPM

Required: APR Framework (Code 50000)

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

HEAD acoustics

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