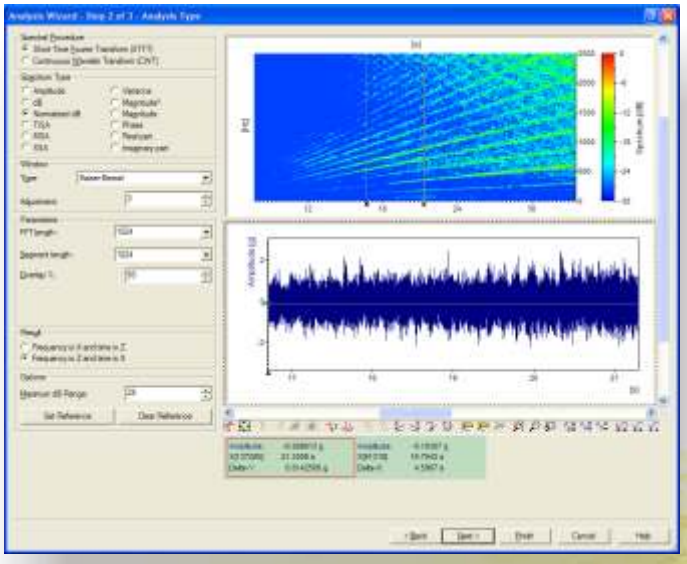
WEISANG

FlexPro®

Spectral Analysis Option

Adds state of the art spectral analysis methods for stationary and non-stationary signals and time series:

- Frequency-domain methods: windowed Fourier spectra, periodograms, multitaper spectra, transforms for unevenly sampled data
- Time-frequency methods: short-time Fourier transforms, continuous wavelet transforms
- Parametric and Eigenanalysis methods: principal-component AR and ARMA, minimum variance, MUSIC and EV eigenspectra
- Harmonic analysis: multicomponent sinusoidal modeling with Fourier, Prony, and principal component frequency identification methods
- Two-Signal analyses: Fourier cross-spectra and cross-periodogram, coherence, Fourier transfer function
- Cepstrum, including “liftering” and reconstruction



Perform complex spectral analysis with FlexPro’s new Analysis Wizard

With FlexPro’s Spectral Analysis Option, you enter a new world of software engineering. You'll save precious time by eliminating the programming or multi-step UI procedures that are normally required for performing sophisticated spectral analysis. By using real-time 2D and 3D spectral graphs, the new FlexPro’s Analysis Wizard offers immediate visual feedback when changing algorithms, algorithm parameters, and spectral formats.

Quickly locate your signal components

FlexPro’s Spectral Analysis Option gives engineers and researchers the power to rapidly find the components of complex signals. A rich set of spectral analysis procedures helps you make intelligent signal content conclusions for any application. The built-in spectral analysis procedures include: FFT, AR, ARMA, Minimum Variance, Eigenanalysis, Continuous Wavelets, Cross-Spectra, Coherence, and Transfer Function Estimation.

Identify frequency and power with Fourier analysis

Get a complete picture of the frequency signature of a signal using up to five different Fourier spectrum methods. Solve the leakage problem found with a standard FFT by using one of the thirty built-in data-tapering windows. The latest innovations in algorithms, adaptive spectra, and peak determination help you to better characterize the frequency and power of each signal component. You can even manage unevenly spaced data with Fourier techniques originally developed by astrophysicists.

Effortlessly analyze non-stationary data

Simultaneously find the time and frequency localization components of a non-stationary periodic signal with Short-Time Fourier Transform or Continuous Wavelet Transform methods. For the CWT, the Spectral Analysis Option gives you a choice of three adjustable wavelets in both real and complex forms in order to find the optimum time-frequency resolution tradeoff.

Principal component modeling

The Spectral Analysis Option offers state of the art methods for isolating the spectra of the principal components within a signal. These methods remove of the influence of noise in the AR SVD, ARMA SVD, and Eigendecomposition procedures, enabling you to optimize the estimation of narrowband components.

Harmonic analysis

Advanced parametric sinusoidal modeling is offered with your choice of frequency estimation methods. The number of harmonics or spectral peaks can be set directly by count or indirectly by spectral threshold.

Spectral Analysis and Acoustics

Fourier Spectral Analysis

Procedures: windowed Fourier spectrum, periodogram, Fourier multitaper spectrum, spectrum of unevenly sampled data, cepstrum

Transforms: best exact n method automatically chosen from four different algorithms (radix2, prime factor, mixed radix, chirp-Z)

Spectral formats include: amplitude, RMS amplitude, amplitude², magnitude, magnitude², phase, dB, normalized dB, TISA power, MSA power, SSA power, variance, complex, real part and imaginary part

Options for zero padding and to display white noise critical limits

Data tapering windows, 21 fixed width, 9 adjustable width including Kaiser-Bessel, VanderMaas, Chebyshev, and Slepian DPSS

Fourier peak detection by bin interpolation

Parametric and Eigen Spectral Procedures

Autoregressive (AR) spectral estimators: autocorrelation, maximum entropy (Burg), least-squares normal equations, least-squares covariance and modified covariance, SVD principal component AR

Autoregressive-Moving-Average (ARMA) spectral estimators, including non-linear optimization and singular value decomposition SVD for signal-noise separation

Eigenanalysis methods: MUSIC (Multiple Signal Classification), EV (Eigenvector)

Select signal and noise sub-spaces for SVD or Eigen-based signal noise thresholding

Peak detection by complex roots of AR polynomial or eigenmodes

Adaptive spectra using Runge-Kutta algorithm to accurately map sharp spectral peaks, minimize spectrum length

Time-Frequency Spectral Analysis

Short-Time Fourier Transform (STFT) spectrum

Continuous Wavelet Transform (CWT) spectrum multi-resolution time-frequency techniques

Wavelet spectra can be generated with up to 1000 linear or logarithmic frequencies, range of frequencies can be customized

Adjustable mother wavelets: Morlet, Paul, Gaussian Derivative

Offers capability of ultra high frequency resolution with very large signals

Harmonic Analysis

Sinusoid or damped-sinusoid modeling using automatic, Fourier, AR, Eigen, or Prony algorithms for frequency estimation

Harmonics table, THD, SNR, SINAD and de-noised signal

Two-Signal Spectral Analysis

Fourier windowed cross-spectra and Fourier cross-periodogram

Coherence including SNR spectra

Fourier domain transfer function

Acoustics Option

Adds state of the art acoustical methods:

- Sound power computation including all correction terms for barometric pressure and temperature (K_0), background noise (K_1), environmental correction (K_2) and enveloping surface (L_s)
- Sound level evaluation: Frequency weighting Linear, A, B, C. Time weighting Fast, Slow, Impulse Leq, Peak. Results may be level versus time or last level. Easy calibration support.
- Octave analysis using time domain filters: Resolution octave, third octave and 1/6, 1/12 and 1/24 octave. Frequency weighting of result may be Linear, A, B, C.

Perform sound level and sound power computations with FlexPro's new Analysis Wizard

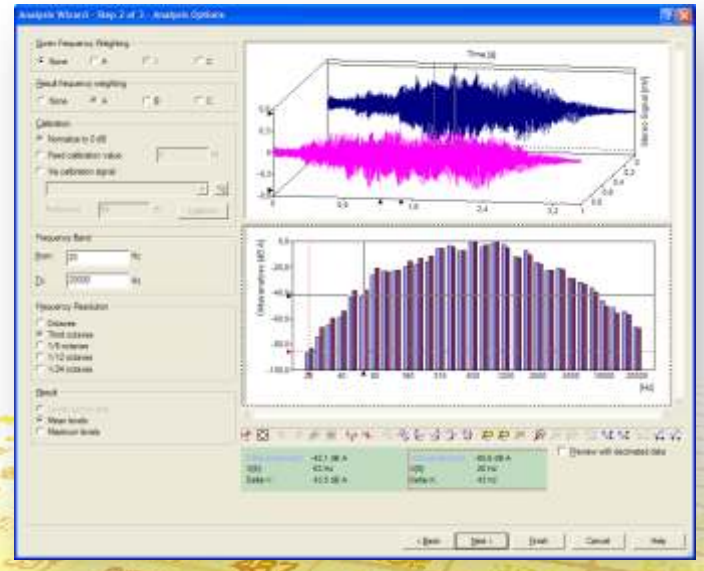
FlexPro's newly released Acoustics Option performs accurate sound level and sound power measurements. In one easy and automatic step, you can effortlessly characterize multiple channels of sound data. In order to optimally estimate sound levels and power, FlexPro's innovative visual Analysis Wizard offers real-time 2D and 3D graphs and true interactive numerics. Acoustic analysis has never been this easy!

Calibrations made easy

To obtain accurate sound levels, a calibration must be performed. You may either specify a fixed calibration value or let FlexPro calculate the value from a calibration signal recorded with the calibrator attached to the microphone. You may do an automatic calibration by attaching a calibrator to the microphone prior to the measurement for a few seconds and then continue with your measurement.

Compute accurate octave analysis in time domain

An octave analysis based on FFT methods will often lead to incorrect results. This is especially true at low frequencies. For most acoustic applications, it is thus necessary to compute octave analysis using time domain filters. With FlexPro's Analysis Wizard you easily set the frequency range and resolution. The Wizard builds a complete report with just a couple of mouse clicks.



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