DIGITAL INDUSTRIES SOFTWARE

Simcenter Anovis Software for industrial testing

Simcenter/AN-MON.001/2023/20231207

Product Information Sheet

Summary

The Simcenter Anovis Process Monitoring system controls fast working production machines like e. g. press, saw and punch. Machine sounds and vibrations are purposefully assessed by the help of vibration and sound analysis. Broken die, pre-damaged material, foreign body, polluted press set-ins etc. are recognized immediately and the machine is stopped.

Simcenter Anovis Process Monitoring checks automatically executed assembly processes as well as material processing of components. Typical noises or breakage notification are recorded acoustically and assessed for quality. Thereby the user does not need to become expert in vibration measurement technology.

BENEFITS

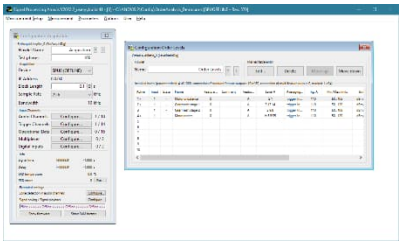
- Reliable vibro-acoustic process monitoring
- Objective monitoring of noise and vibration emitted by the process,
- Detection and identification of faults only visible in noise and vibration
- Modular system: Anovis can be adapted to a wide variety of applications without the need of programming
- Seamless integration into the test bench environment

Simcenter Anovis Mon allows usage of all standard signal processing and metric calculation functions of the Simcenter Anovis system to be used in a pre-defined measurement setup for the specific monitoring task
The Simcenter Anovis Process Monitoring system has adaptive analysis abilities, so that it adjusts itself automatically to occurring process drift, caused e. g. through heating, uncritical wear and tear and slight cycle fluctuations. A manual readjustment of the system in operation is thereby reduced.
An automatic discrimination of normal production drift (including permissible machine condition) including quality relevant events and changes to product and machine.
The results from the basic parameterization are used for the drift recognition and for the automatic, computer supported compensation.

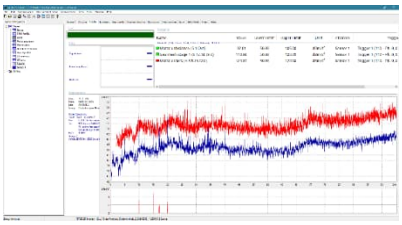
Anovis-Mon

Components

Simcenter Anovis Signal Processing Software to load and operate measurement setups designed with the Simcenter Anovis Lab Software or with Simcenter Anovis Professional



Simcenter Anovis Analyzer Software with functionality necessary to present the test results as numbers



and simple curves and on-line statistics

Signal Processing and Metric calculation

The following signal processing modules are included in Simcenter Anovis Lite (in alphabetical order):

AngleFeatures: Metric calculation based on angle synchronous signal

AngleSyncAvrg: Angle synchronous averaged signal

Calib: Manual and automatic calibration of time signal including sensor definition

Differentiator: Differentiation of time signal

Envelope: Calculation of a time signal envelope

FeatureAverage: Averaging of feature vectors

FeatureDifference: Difference calculation of two vector features

FeatureDiffweight: Difference weighting of feature vector

FeatureNormalise: Variance weighted normalization of a feature vector

FeatureTolerance: Rating of an input vector with a tolerance vector

FeatureToleranceScheme: Rating of an input vector with a tolerance vector, enhanced functionality

Filter: Filtering of a time signal with a FIR-Filter (LP, HP, BP, user-defined filter coefficients)

FreqAnalysis: FFT-Analysis of a time equidistant signal including windowing and optional a-weighting, FFT-length 64 to 32768

FreqLevelAvrg/FreqLeveRatio: Calculation of frequency levels (single, harmonic, range, overall, user, sideband metrics and combinations thereof)

FreqLevelAvrgWithRpm: Like FreqLevelAvrg, but with revolution speed processing

FreqLevelTrackVsRpm: Calculation of frequency level tracks vs. revolution speed (single, harmonic, range, overall, user and combinations thereof)

FreqLevelTrackVsTime: Calculation of frequency level tracks vs. time (single, harmonic, range, overall, user and combinations thereof)

FreqLevelTrackVsRef: Calculation of frequency level tracks vs. arbitrary reference (single, harmonic, range, overall, user and combinations thereof)

FreqSonagramVsRpm: Calculation of frequency-revolution-speed sonagrams (Campbell diagrams)

FreqSonagramVsTime Calculation of frequency-time sonagrams

FreqSonagramVsTimeWithRpm: Calculation of triggered frequency-time sonagrams with additional revolution speed processing

FreqSpec: Calculation of a free running or triggered frequency spectrum (auto-spectrum, peak-hold, power cepstrum modulation spectrum)

FrequencyFeatures: Identification of resonance features in an averaged frequency spectrum (auto-spectrum in dB)

Integrator: Integration of time signal

MathAbs: Absolut value calculation of any input data

MathClip: Range limiting (clipping) of any input data

MathFunc: Calculation of abs, sqr or sqrt of any input data

Message2Data: Synchronization of trigger messages and data channels

ResamplingChannel: Turn angle synchronous resampling of time equidistant signals (linear or quadratic interpolation of angle times)

ResultBuf: Collecting and storing of result buffers resp. making data buffers available for display

RpmChannel: Conversion of tacho data into a revolution speed channel

RpmProfile: Profile of revolution speed vs. time

RpmTrigger: Generation of trigger messages from revolution speed and test stage information

SpectrumAveraging: Calculation of averaged spectra with optional tolerance vector rating

SpectrumAveragingBasic: Calculation of averaged spectra

SpeedChannel: Logical distance-speed channel

SrdAcquis: Connector for all types of standard Anovis signal recording devices (SRD)

TachoConvert: Conversion of special tacho signals from IC engines

ThirdOctaveSpectrum: Calculation of third octave spectra from time signals

TimeSignalAnalysis: Metric calculation from time signal including rating (min, max, mean, RMS, power, peak, range, crest, median, std, kurtosis, excess, skewness)

TimeSignalFeatures: Metric calculation from a signal vector vs. time (min, max, mean, std, maxpos, minpos, emean, esum, sum, crest, cnt, area-min/max/total, l-area-min/max/total)

TimeSignalProfile: Signal profile vs. time with min-max-reduction and optional percentile calculation

TriggerAudioExtTrig: Trigger module to generate trigger messages based on external triggers, signal events and phases

TriggerPulseSplitter: Splitting of a trigger/tacho signal

TriggerTime: Special flowlet to display the trigger timings

VarWriter: Collects data buffers to be displayed in the Anovis Analyzer without rating and saving as result file

VectorCombine: Calculates combination of asynchronous calculated data vectors (min, max, mean, diff, sum, emean, esum)

VectorFeatures: Metric calculation from a signal vector (min, max, mean, std, maxpos, minpos, emean, esum, sum, crest, cnt, area-min/max/total, l-area-min/max/total)

Visualization

Results created from the Simcenter Anovis Signal Processing software can be displayed in the available viewers. The viewers contain comprehensive functionality to show single measurement results, like zoom, cursors, markers etc. The following data viewers are included in Simcenter Anovis Lite (in alphabetical order:

Alarm signs: Visualization of one or more metrics as color field in green/red/orange depending on the result including supplementary information about the displayed data.

Bar vector: Visualization of third octave spectra as bars including supplementary information about the displayed data and the test run.

Bitmap: Displays a user defined bitmap

Digits: Visualization of one or more metrics as digit in blue/red depending on the result including supplementary information about the displayed data.

Level meter: Visualization of signal levels and metrics as bar graph with limits

Lines: Visualization of vectors as line including supplementary information about the displayed data and the test run with optional tolerance window.

On-Line-Statistics: Visualization of one or more metrics as trend and histogram including assessment limits including supplementary information and statistics about the displayed data.

Table: Visualization of one or more metrics as chart with icons in green/red/orange depending on the result including supplementary information about the displayed data.

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