▲ DEWESoft®

SINE PROCESSING

STRUCTURAL DYNAMICS CHARACTERIZATION,
DURABILITY AND FATIGUE TESTING, DESIGN VALIDATION AND QUALIFICATION.

INTRODUCTION

Sine processing is a tool to perform structural tests on large structures. Identify and analyze natural frequencies of such structures by exciting them with **a sweep of single frequencies**, that are being tracked by the Dewesoft X software plugin using COLA signal from your shaker. As desired output, Sine processing returns the **structural resonance frequencies, amplitudes, phase, THD of response and also transfer functions** between excitation and response points.

Dewesoft X3 software – with the Sine processing plugin – is the most powerful structural analysis tool, supporting the evaluation of responses and transfer functions on an unlimited number of channels, all **done in real-time.** A valuable tool for manufacturers, designers, and engineers.

Integrate and synchronize your data acquisition system seamlessly with your shaker and perform a powerful evaluation of structural properties in real-time by using the Dewesoft Sine processing plugin. Set up in just a few steps and start measuring right away.

FUNCTIONALITY

Sine vibration testing applies a single frequency to a test item and selectively excites resonant structures within the device. In a swept sine test a vibration sine tone is ramped up and down through a range of frequencies and for a specified rate and duration.

Real-time calculation and functions of the excitation frequency:
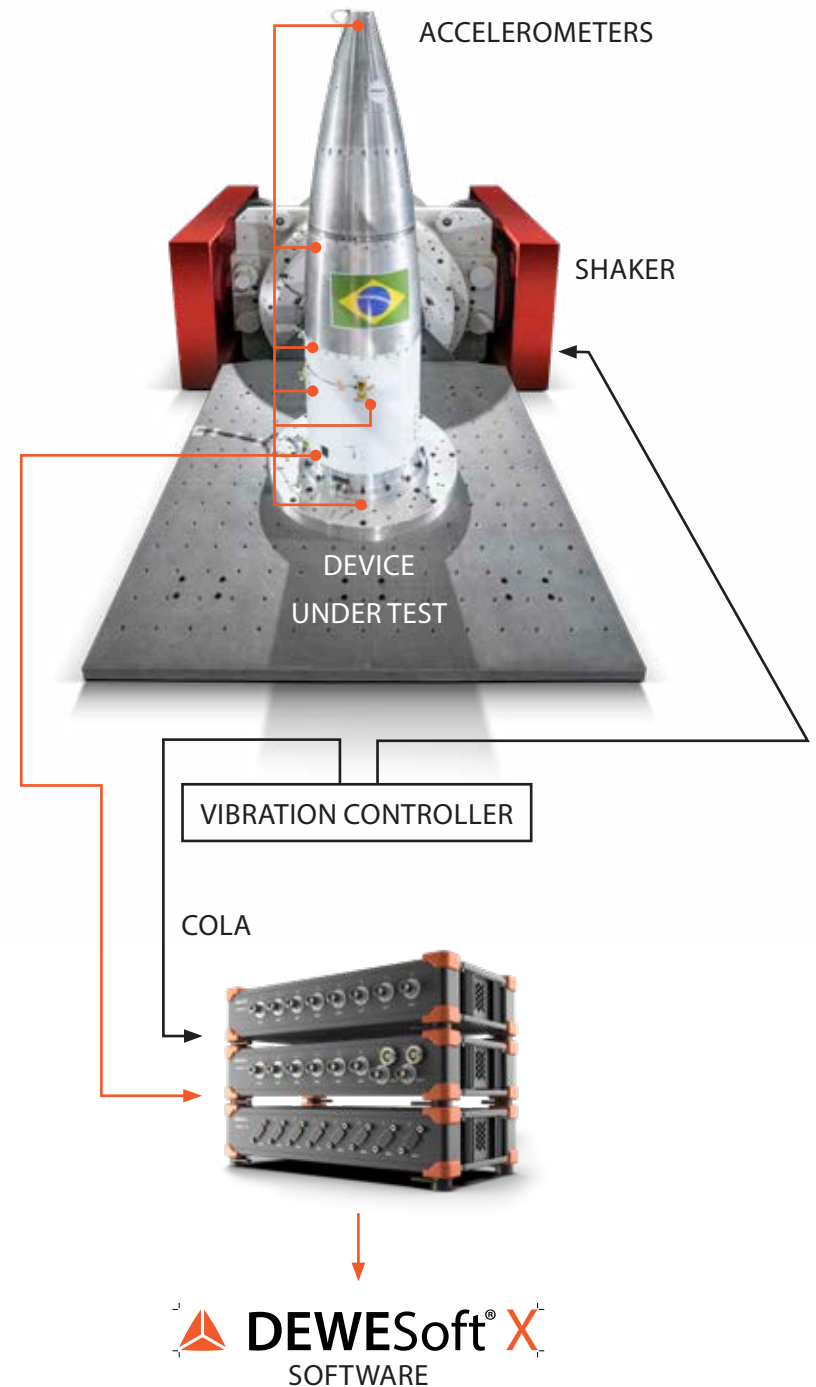- Detection of amplitude, frequency, and phase of the vibration reference
- Extraction of harmonic components (Peak and RMS) of all measured signals
- Extraction of the overall broadband signal (Peak and RMS) level of all measured signals
- Calculation of transfer function (FRF, coherence, etc.) and the total harmonic distortion (THD) between the reference signal and any point measured on DUT.

APPLICATIONS

Sine processing tests enable the detection, identification, and analysis of the tested products' ability to function in a vibration environment, fatigue life, resonant frequencies or even squeak and rattle sound output (NVH).

It is used to validate and qualify product designs and to establish operational limits in a range of industries:
- Aerospace, e.g. launch system providers or satellite manufacturers.
- Automotive, e.g. engine mounted components.
- Defense, ground transport, and any manufacturer of larger structures that have limited room for failure and must perform perfectly on deployment.

ACCELEROMETERS

SHAKER

DEVICE
UNDER TEST

VIBRATION CONTROLLER

COLA

DEWESoft® X
SOFTWARE

KEY FEATURES

ONLINE AND OFFLINE ANIMATION
Determine the quality of results - animation of structure in all three directions with different projections during (and after) measurement.

DATA EXPORT
Data can be exported in virtually any data format used for NVH analysis.

REAL-TIME CALCULATION
Peak, RMS, THD, phase, transfer functions for each available point in real-time.

STORE AUTOMATICALLY
Automatic storing on desired trigger conditions.

UNMATCHED POWER OF CALCULATION
Runs octave and FFTs simultaneously on all channels and all in real-time.

DIFFERENT MODES OF FREQUENCY DETECTION
Zero crossing and Hilbert transform for detecting the exact frequency of the sweep produced by the shaker controller and driving the shaker through an amplifier.

UNLIMITED NUMBER OF CHANNELS
Supports real-time calculation on an unlimited number of channels.

FUTURE-PROOF APPLICATION
Lifetime free upgrades and support.

DEWESOFT QUALITY AND FLEXIBILITY
Simply add additional parameters to the same measurement system and expand your measurement chain in seconds.

COMPLETE SINE PROCESSING TESTS
Directly integrates with your existing shaker and controller, needing only the COLA signal to sync perfectly.

TEDS SUPPORT
Save time by using teds accelerometers which are supported by Dewesoft X3 and on all Dewesoft hardware.

EASY TO SET UP AND USE
Simply connect the accelerometers and COLA signal, assign the correct channels and start measuring.

SPECS

DAQ SYSTEM - SIRIUS ACC TYPE INPUT		
Inputs		
Input types	Voltage, IEPE	
ADC Type	24bit delta-sigma dual core with anti-aliasing filter	
Sampling Rate	Simultaneous 200kS/sec	
Ranges (Dual Core Low Range)	**±10V (±500mV)**	**±500mV (NA)**
Input Accuracy (Dual Core)	±0.1% of reading ±10(1)mV	±0.1 of reading ±1(NA)mV
Dynamic Range@10kS (Dual Core)	140 dB (160 dB)	135 dB (NA)
Typ. SNR@50kS (Dual Core)	107 dB (125 dB)	100 dB (NA)
Typ. CMR @ 50Hz/1kHz	140/120 dB	140/120 dB
Gain Drift	Typical 10 ppm/K, max. 30 ppm/K	
Offset Drift	Typical 0.5 µV/K + 2 ppm of range/K, max 2 µV/K + 10 ppm of range/K	
Gain Linearity	<0.02%	
Inter Channel Phase-mismatch	0.02° * fin [kHz] + 0.1° (@ 200 kS/sec)	
Channel Cross talk	>160 dB @ 1kHz	
Input Coupling	DC, AC 0.1 Hz,1Hz	
Input Impedance	1 MΩ (270kΩ for AC coupling ≥ 1Hz) in parallel with 100pF	
Overvoltage Protection	In+ to In-: 50 V continuous; 200V peak (10msec)	
IEPE mode		
Excitation	2, 4, 8, 12, 16 or 20mA	
Compliance voltage	25 Volt	
Output Impedance	>100 kΩ	
Sensor detection	Shortcut: <4Volt; Open: > 19Volt	
Additional Specifications		
Input connector BNC	BNC	
TEDS support	IEPE mode only	

SOFTWARE: DEWESoft X3	
Recommended	
Processor:	Intel Core i7 with 4 Cores (3rd generation or higher)
RAM:	8 gigabyte (GB)
Hard drive:	Solid-state drive (SSD)
Graphic card:	Compatible with DirectX 11
Minimum display resolution	1280x720 (HD Ready)
Operating system:	Windows 10 64-bit
*Actual requirements may be different due to specific setup configuration.	

TYPICAL CONFIGURATIONS

Dewesoft sine processing:

- SIRIUS dual-core modular 8xAcc - R8 dual-core 64xAcc
- 8-64x Dewesoft 13TI-50G-1 triaxial accelerometer
- 8-64x 6824A Triaxial cable 4pin to 3BNC
- Dewesoft sine processing plugin

Optional:

- Dewesoft I3T-50G-1 triaxial accelerometer
* for more than 64 channels, more units of this same configuration is added

RELATED PRODUCTS

- Modal analysis
- Shock response spectrum (SRS)
- Octave analysis
- FFT