

THE MEASURABLE DIFFERENCE.



DEWETRON

▼

---

# OXYGEN TRAINING > SWEEP SINE ANALYSIS



# GENERAL PURPOSE

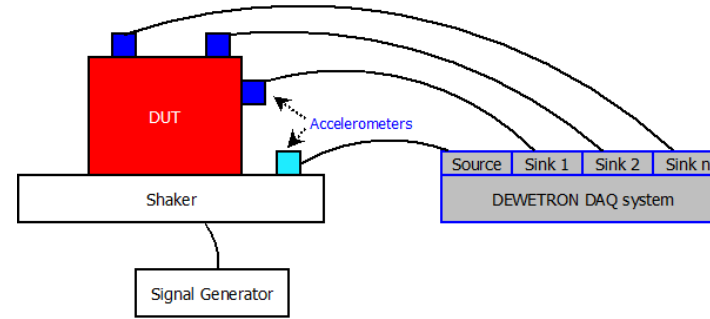


DEWETRON

Analysis Tool for Shaker Applications with Swept-Sine Excitation

Calculates Amplitude and Phase Values of over 100 Channels simultaneously

Analyze Frequency Response from 1 Hz up to 20 kHz





DEWETRON

© DEWETRON GmbH | January 24

# CREATING A SWEPT SINE ANALYSIS

- 1 Open the channel list and select the checkbox of the reference channel
- 2 Select the checkbox(es) of the input channel(s)
- 3 Press the + button
- 4 Select *Swept Sine Analysis*
- 5 Press the *Add* button

The screenshot shows the 'Add Channel - Swept Sine Analysis' dialog box. The background interface shows a channel list with 'Reference' (AI 2/4) and 'Input 1', 'Input 2', 'Input 3' (AI 2/1, AI 2/2, AI 2/3) channels selected. The dialog box has the following sections:

- FFT**: Perform swept sine analysis for shaker testing. Group name: Swept Sine Analysis Channels.
- Filters**: IIR Filters, FIR Filters.
- Advanced Math**: Cepstrum/Quefrency, Correlation, Rosette, Modal Test, Frequency Measurement, Constant Percentage Bandwidth (CPB) Analysis.
- Optional Calculations**: Power Group, Order Analysis, **Swept Sine Analysis** (highlighted), Psophometer, Sound Level.

Buttons at the bottom: Cancel, Add (highlighted), Zero, Scan TEDS, Disable TEDS.



# EDITING THE SWEPT SINE ANALYSIS SETTINGS

- ① Reference Channel (shaker output) can be changed here
- ② Threshold in percentage of channel input range
- ③ Frequency response either as RMS or Zero-Peak Amplitude
- ④ Start and stop frequency selection for Swept Sine Analysis
- ⑤ Step size for Swept Sine Analysis
- ⑥ Number of periods of the reference signal after which the calculation is updated
- ⑦ Input channels for swept sine analysis (several selectable)
- ⑧ Optional output of amplitude and phase as time domain channels
- ⑨ Optional output of bode diagram (frequency domain channels)

**REFERENCE CHANNEL**

Reference channel  ①

Detection Threshold  ② %

**SWEPT SINE ANALYSIS OPTIONS**

Mode  ③

Start frequency  ④ Hz

End frequency  Hz

Step size  ⑤ Hz

Periods  ⑥

**INPUT CHANNELS**

Show selected channels only

All Search...

<input type="checkbox"/>	Name
<input checked="" type="checkbox"/>	LocalNode
<input checked="" type="checkbox"/>	Filters 1
<input checked="" type="checkbox"/>	Input_LP
<input type="checkbox"/>	[Re]

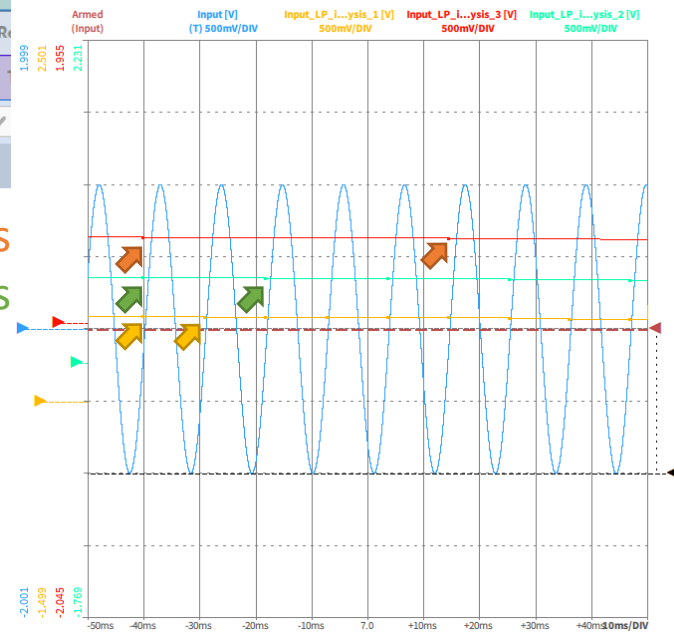
⑦









**OUTPUT CHANNELS**

Enable immediate value channels ⑧

Enable Bode diagrams ⑨

5 Periods  
2 Periods  
1 Period



<input checked="" type="checkbox"/>	<b>SweptSineAnalysis_1</b>	
	<b>F_fund</b> Fundamental Frequency	
	<b>Input_LP_iRMS</b> Immediate Fundamental RMS	
	<b>Input_LP_iPhi</b> Immediate Fundamental Phi	
	<b>Input_LP_iUFRMS</b> Immediate Unfiltered RMS	
	<b>Input_LP_RMS</b> Fundamental RMS Bode	
	<b>Input_LP_Phi</b> Fundamental Phi Bode	
	<b>Input_LP_UFRMS</b> Unfiltered RMS Bode	

- > Frequency domain channels:
  - > Ch\_RMS: Fundamental RMS frequency response
  - > Ch\_Phi: Fundamental Phi frequency response
  - > Ch\_UFRMS: Unfiltered RMS frequency response
- > Time domain channels:
  - > F\_fund: Fundamental frequency
  - > Ch\_iRMS: Immediate fundamental RMS
  - > Ch\_Phi: Immediate fundamental Phi
  - > Ch\_iUFRMS: Immediate unfiltered RMS
- > Zero-peak instead of RMS selection possible

- Maximum frequency span: 1 Hz – 20 kHz
- Recommendation: Sample Rate :  $20 * f_{\text{max}}$
- Resolution 1 – 100 Hz
- Max 10 periods for averaging
- If the sweep does not exactly hit exactly one frequency bin contained in the array, data for the certain frequency bin is filled up by linear interpolation of the two narrowed frequency bins
- If one bin is hit several times, the max value will be stored



# EXERCISE

- Create a Swept sine Analysis
- Reference channel: Sweep from 1 – 1000 Hz
- Input channel 1: Filtered Reference channel: LP-Filter;  $f_c = 100$  Hz, 4<sup>th</sup> order Bessel
- Input channel 2: Filtered Reference channel: LP-Filter;  $f_c = 200$  Hz, 8<sup>th</sup> order Butterworth

SweptSineAnalysis\_1

REFERENCE CHANNEL

Reference channel

Detection Threshold  %

SWEPT SINE ANALYSIS OPTIONS

Mode

Start frequency  Hz

End frequency  Hz

Step size  Hz

Periods

INPUT CHANNELS

Show selected channels only

All Search...

	Name
<input type="checkbox"/>	LocalNode
<input type="checkbox"/>	Filters 1
<input type="checkbox"/>	Input_LP_1
<input checked="" type="checkbox"/>	Input_LP
<input type="checkbox"/>	[RemoteNode]

OUTPUT CHANNELS

Enable immediate value channels

Enable Bode diagrams

