

#1311: OptiStruct – Sine Sweep Fatigue Analysis

Product: OptiStruct

Product Version: OptiStruct 2017.2.2 or above

Topic Objective

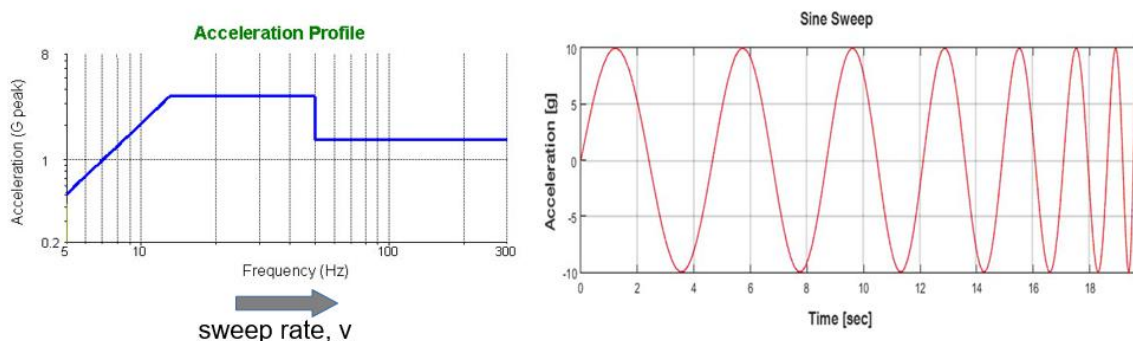
Sine sweep fatigue analysis in OptiStruct.

Topic Detail

Sine Sweep Fatigue Analysis: Sine sweep is a well-known method of vibration testing which is conducted to evaluate the vibration behavior of a specimen. It is the study of fatigue life of structures under Sinusoidal Loading.

- The setup is very similar to a Frequency Response Analysis setup, with an additional Fatigue subcase, and additional required Sine Sweep parameters. The *LCID* field on the FATLOAD entry references the subcase ID of the Frequency Response Analysis subcase.
- Frequency Response Stress results from the Frequency Response Analysis are used to calculate the frequency-dependent stress range, which are subsequently used to calculate Fatigue damage based on sweep rate.
- Both Stress-Life and Strain-Life approach is available for Sine Sweep Fatigue analysis.

Acceleration Profile and Sweep rate



FATPARAM Bulk Cards

- The *TYPE* field on the **FATPARAM Bulk Data Entry** can be used to identify stress-life (SN) or strain-life (EN) sine sweep fatigue analysis.
- The *SWEEP* continuation line on the FATPARAM Bulk Data Entry can be used to define the frequencies (*NF* or *DF* fields) at which the sine sweep fatigue calculations are performed. Additionally, the *STSUBID* field can be used to identify a static subcase for mean stress correction.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FATPARM	ID	TYPE	MAXLFAT						
	STRESS	COMBINE	CORRECT	STRESSU	PLASTIC	SURFSTS			
	SWEEP	NE	DF	STSUBID					

FATLOAD Bulk Cards

- The *LCID* field on **FATLOAD Bulk Data Entry** references a Frequency Response Analysis subcase.
- The *SWEEP* continuation line should be specified on FATLOAD Bulk Data Entry, and corresponding sine sweep parameters, via *SR* (sweep rate) and *SRUNIT* (sweep rate unit) fields are required.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FATLOAD	ID	TID	LCID	LDM	Scale	Offset			
	SWEEP	SR	SRUNIT						

FATSEQ Bulk Cards

- The *N#* fields on the **FATSEQ Bulk Data Entry** identifies the number of sweeps of the corresponding *FID#* reference and the *T#* fields define the time in

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FATSEQ	ID								
	FID1	N1/T1	FID2	N2/T2	FID3	N3/T3	FID4	N4/T4	
	FID5	N5/T5							