

#1285: OptiStruct – Units to be maintained for Random response analysis

Product: OptiStruct

Product Version: OptiStruct 12.0 or above

Topic Objective

Units to be maintained for Random response analysis in OptiStruct.

Topic Details

We define RANDPS & TABRND1 card for Random response analysis.

TABRND1 – Power Spectral Density Table

Description

Defines power spectral density as a tabular function of frequency for use in random analysis.

Referenced on the RANDPS entry.

RANDPS – Power Spectral Density Specification

Description

Defines load set power spectral density factors for use in random analysis having the frequency dependent form $S_{jk}(F) = (X + iY) G(F)$.

TABRND1 do not have any unit system, It's the user responsibility to maintain consistency of Units.

The below table should explain you to use the consistent units / conversion in Random response analysis:

PSD - Input	Model - Units	SPCD (FRF)	PSD - Output	RMS - Output
G^2 / Hz	mm	9810	$(\text{mm}/\text{s}^2)^2 / \text{Hz}$	mm/s ²
$(\text{mm}/\text{s}^2)^2 / \text{Hz}$	mm	1	$(\text{mm}/\text{s}^2)^2 / \text{Hz}$	mm/s ²
G^2 / Hz	mm	1	G^2 / Hz	G

For example: If PSD input is in G^2 / Hz and the rest of the model units are in mm, you should apply 1g loading as 9810 value in FRF step. In this case, the PSD outputs will be in $(\text{mm}/\text{s}^2)^2 / \text{Hz}$

If PSD input is in $(\text{mm}/\text{s}^2)^2 / \text{Hz}$ and the model units are in mm, apply a unit acceleration value in FRF step. In this case, the PSD outputs will be in $(\text{mm}/\text{s}^2)^2 / \text{Hz}$