

Power-spectral-density FAQ



This page is devoted to **frequently asked questions** (FAQ) related to [power-spectral-density](#) analysis.

Can I use power-spectral-density analysis to evaluate human-induced vibrations?

Answer: Power-spectral-density (PSD) analysis is not well-suited for human-induced vibrations because this type of excitation is periodic, and not harmonic. PSD analysis evaluates the probabilistic response of a structure subjected to a range of harmonic frequencies. Probabilities are assigned to the likelihood of each harmonic load pattern, then, for each response parameter, a root-mean-square (RMS) formulation computes the approximate response expected at each applied frequency. PSD analysis is most suitable for fatigue behavior and applications similar to [response-spectrum](#) analysis.

Periodic modal [time-history](#) analysis is the methodology most suitable for human-induced vibrations, such as those from footfalls (running or jumping). The exact configuration, sequence, and magnitude of impacts may be defined in a single function. A periodic modal time-history [load case](#) may be created, as explained in the [human-induced vibrations](#) test problem, which properly scales, modifies, and simulates vibration through application of the appropriate function. The time factor, available using the Advanced load parameters control, adjusts the length of the period of excitation. Output time steps should be adjusted such that the duration of dynamic loading corresponds to a single period.

The [modes](#) used should be suitable for time-history analysis. [Ritz vectors](#) are best for point loading. The number of modes needed is equal to the number of individual impacts within the load case.

The time history of [joint accelerations](#) and other response quantities may be plotted or displayed in tabular output.

See Also

- [Human-induced vibrations](#) article
- [Floor vibration due to human footfalls](#) article