

Spanos, P. D.; Di Paola, M.; Failla, G.

A Galerkin approach for power spectrum determination of nonlinear oscillators. (English)

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The authors construct an approximate procedure to estimate spectral properties of nonlinear single-degree-of-freedom systems with random perturbations. The procedure is based on Galerkin method. Firstly, the system response is expanded into Fourier series with random coefficients. Next, a set of nonlinear equations containing the unknown parameters of response is derived. In doing so, the authors assume that the nonlinearity is given by a cubic polynomial. The desired estimates are obtained by averaging the square modulus of Fourier coefficients over various excitation processes. A few numerical examples exhibit the capacities of the proposed algorithm in comparison with other computational methods.

Reviewer: [Elena Ya. Gorelova \(Samara\)](#)

MSC:

[70L05](#) Random vibrations in mechanics of particles and systems

[70K40](#) Forced motions for nonlinear problems in mechanics

Cited in **6** Documents

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[Fourier series](#); [Galerkin method](#); [cubic nonlinearity](#)

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