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An enhanced technique for analyzing structural vibration problems under shot noise loading

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Abstract

The present paper deals with dynamic nonlinear systems loaded by badly defined forcing actions. As an improvement on the first approximate procedure developed by the authors, a more feasible and reliable alternative entropic closure approach is presented herein. Such a procedure allows one to deal with high order nonlinearities, and it can be suitably generalized to treating multi-degree of freedom (MDOF) systems. In fact, the effectiveness of the proposed approach is intricately linked to the exact calculation of some multiple integrals related to the approximate expression of the chosen response probability function. To this end, a procedure that can guarantee high accuracy in the computation of integrals is also studied, which helps in validating the whole approach. © World Scientific Publishing Company.

Author keywords

Entropy functional; Fokker-Planck-Kolmogorov equation; Joint probability density function

Indexed keywords

Engineering controlled terms: Approximation theory; Degrees of freedom (mechanics); Nonlinear systems; Probability density function; Structural analysis
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AN ENHANCED TECHNIQUE FOR ANALYZING STRUCTURAL VIBRATION PROBLEMS UNDER SHOT NOISE LOADING

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Keywords: Fokker-Planck-Kolmogorov equation; entropy functional; joint probability density function

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