

A PRACTICAL SOLUTION FOR COMPLEX DYNAMIC SYSTEMS SUBJECT TO RANDOM INPUT

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A method is developed for estimating output statistics and mean failure rates for dynamic systems subject to random input. The method is based on statistical techniques and non-Gaussian translation models, and can be used to assess the performance of complex dynamic systems regardless of their constitutive law and/or number of degrees of freedom. A collection of simple, relevant example problems is considered and used to illustrate the method. Approximate solutions using the proposed method are compared with exact solutions when available. It is demonstrated that the accuracy of the estimated system performance depends on output sample size and correlation structure.

Keywords: nonlinear dynamic systems, random vibration, translation processes.