Exact Solutions for Steady Response of Nonlinear Systems under Non-White Excitation

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Abstract : In the present study, the exact solutions for the steady response of quasi-linear systems under non-white wide-band random excitation are considered by means of the stochastic averaging method. The non linearity of the systems contains the power-law damping and the cross-product term of the power-law damping and displacement. The drift and diffusion coefficients of the Fokker-Planck-Kolmogorov (FPK) equation after averaging are obtained by a succinct approach. After solving the averaged FPK equation, the joint probability density function and the marginal probability density function in steady state are attained. In the process of resolving, the eigenvalue problem of ordinary differential equation is handled by integral equation method. Some new results are acquired and the novel method to deal with the problems in nonlinear random vibration is proposed.