

A new approach for non-Gaussian vibration analysis of hyperbolic tangential package

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Abstract

A new approach is proposed to analysis the non-Gaussian random vibration of hyperbolic tangential package. Firstly, the non-Gaussian vibration noise of specified mean, variance, skewness and kurtosis is developed by Hermite polynomial, and verified by Gaussian mixture model (GMM) theory. Secondly, next to analyzing an analytical and numerical response of the two degrees of freedom (TDOF) linear package, the acceleration response of the TDOF hyperbolic tangential package system (HTPS) under non-Gaussian vibration excitation is obtained though the Hermite polynomial and Runge-Kutta method, and the effects of the external excitation and system parameters are investigated. Finally, on the basis of the first-passage probability of the acceleration response, the reliability analysis method is introduced. The analysis provides a guidance to the vibration reliability analysis and packaging optimization design.

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