

Path integral approach and Kolmogorov-Feller equation for nonlinear systems under parametric Poisson white noise

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Abstract: In this study the response evaluation in terms of probability density function (PDF) of nonlinear systems under parametric Poissonian white noise is examined. Specifically, the extension of the Path Integral method to this kind of systems is addressed. Notably, these systems exhibit a jump at each impulse occurrence, whose amplitude can be determined analytically assuming two general classes of nonlinear multiplicative functions. Relying on the obtained closed form relations linking the impulses amplitude distribution and the corresponding jump response of the system, the Path Integral method is extended to deal with systems excited by parametric Poisson white noise. On this base, a more amenable version of the pertinent Kolmogorov-Feller equation, that rules the evolution of the response PDF of the system, is also determined.

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