

# FIRST PASSAGE OF FRACTIONAL-DERIVATIVE STOCHASTIC SYSTEMS WITH POWER-FORM RESTORING FORCE

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**Abstract:** First-passage is one branch of reliability in stochastic dynamical systems which can estimate fatigue life of certain structure such as offshore platform, civil constructions and so on. Based on stochastic averaging method, Fourier expansion and finite difference method, first-passage of systems with fractional derivative damping and power-form restoring force subjected to Gaussian white-noise excitation is studied. Numerical results shows that reliability function is affected by both the order of fractional derivative and the value of safe boundary. Moreover, the analytical results are agreement with Monte-Carlo simulation.