

Moments and Mean First-Passage Time of Parabolic-Bistable Potential System Driven by Colored Noise

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Abstract: A parabolic-bistable potential system driven by colored noise is studied. The exact analytical expressions of the stationary probability distribution (SPD) and the moments of the system are derived. Furthermore, the mean first-passage time is calculated by the use of two approximate methods, respectively. It is found that (i) the double peaks of SPD are rubbed-down into a flat single peak with the increasing of noise intensity; (ii) a minimum occurs on the curve of the second-order moment of the system vs. noise intensity at the point $D_T=0.025$; (iii) the results obtained by our approximate approach are in good agreement with the numerical calculations for either small or large correlation time τ , while the conventional steepest descent approximation leads to poor results.

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Key words: moments, mean first-passage time, colored noise, parabolic-bistable potential

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