Optics Express

Volume 22, Issue 16

Nothing of interest.

Volume 22, Issue 17

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Volume 22, Issue 18

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Volume 22, Issue 19

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Volume 22, Issue 20

Nothing of interest.

Volume 22, Issue 21

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Physical Review E

Volume 90, Issue 2

Trapping of diffusive particles by rough absorbing surfaces: Boundary smoothing approach

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We present analytical results for the first-passage statistics of Brownian particles near a comblike absorbing boundary. Our approach is based on the method of boundary homogenization (or boundary smoothing) when an equivalent flat boundary is introduced to maintain the same diffusion flux as the original rough boundary. By using the conformal invariance of the Laplace equation we derive an analytic expression for the position of an equivalent boundary in terms of its spatial period and amplitude. The main analytical results being initially obtained for the steady state system provide important insights into the statistical characteristics of diffusive transport near rough boundaries (high order moments of the trapping time statistics).

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Nothing of interest.

Volume 90, Issue 4

Simulating non-Markovian stochastic processes

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We present a simple and general framework to simulate statistically correct realizations of a system of non-Markovian discrete stochastic processes. We give the exact analytical solution and a practical and efficient algorithm like the Gillespie algorithm for Markovian processes, with the difference being that now the occurrence rates of the events depend on the time elapsed since the event last took place. We use our non-Markovian generalized Gillespie stochastic simulation methodology to investigate the effects of nonexponential interevent time distributions in the susceptible-infected-susceptible model of epidemic spreading. Strikingly, our results unveil the drastic effects that very subtle differences in the modeling of non-Markovian processes have on the global behavior of complex systems, with important implications for their understanding and prediction. We also assess our generalized Gillespie algorithm on a system of biochemical reactions with time delays. As compared to other existing methods, we find that the generalized Gillespie algorithm is the most general

because it can be implemented very easily in cases (such as for delays coupled to the evolution of the system) in which other algorithms do not work or need adapted versions that are less efficient in computational terms.

Systems and Controls Letters

Volume 71

Nothing of interest.

Volume 72

Nothing of interest.

Volume 73

Nothing of interest.

Volume 74

Nothing of interest.

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A Fresh Look at Bayesian Cramer-Rao Bounds for Discrete-Time Nonlinear Filtering

Carsten Fritsche, Emre Ozkan, Lennart Svensson, and Fredrik Gustafsson

In this paper, we aim to relate different Bayesian Cramér-Rao bounds which appear in the discrete-time nonlinear filtering literature in a single framework. A comparative theoretical analysis of the bounds is provided in order to relate their tightness. The results can be used to provide a lower bound on the mean square error in nonlinear filtering. The findings are illustrated and verified by numerical experiments where the tightness of the bounds are compared.