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Title: Nonlinear Reaction-Diffusion Equations connected with Stochastic Control Problems

Abstract: An exactly soluble optimal stochastic control problem involving a diffusive two-state random evolution process will be presented. By using the technique of logarithmic transformations, our class of models is directly connected to a nonlinear reaction-diffusion type equation. The work generalizes the recently established connection between the non-linear Boltzmann-like equations introduced by Ruijgrok and Wu and the optimal control of a two-state random evolution process. In the sense of this generalization, the nonlinear reaction-diffusion equation is identified as the natural diffusive generalization of the Ruijgrok-Wu and Boltzmann model.