

Langevin processes with specular boundary conditions

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Resumo/Abstract:

In this talk, we will present recent studies on a class of Langevin models, confined in some spatial domain, endowing a nonlinear (in the sense of McKean) drift component and submitted to a specular boundary condition. This boundary condition, introduced in the fields of gas dynamics, models the interaction between the particle driven by the Langevin model and a totally elastic wall. The resulting Langevin dynamics involves a singular stochastic differential equation for which existence of solutions is subject to a-priori estimates on the attaining time of the particle at the wall. After a brief exposition of the particular interest for this type of model in the field of fluid mechanics, we will present existence and uniqueness results obtained in the particular situation where the particle are confined within the upper-half plane (see [1]) and the situation of more general manifolds (see [2]), the latter situation requiring a strong combination stochastic analysis and pde point of view. This is a joint work with Mireille BOSSY, EPI TOSCA, INRIA Sophia-Antipolis Méditerranée.

References

- [1] M. BOSSY and J.-F. JABIR, *On confined McKean Langevin processes satisfying the mean no-permeability boundary condition*, Stochastic Processes and their Applications, Vol. 121, Issue 12, 1135-1159 (2011).
- [2] M. BOSSY and J.-F. JABIR, *Lagrangian stochastic models with specular boundary condition*, Submitted (2014).