McKean stochastic differential equations and non-conservative PDEs

Francesco RUSSO [1],

[1] ENSTA ParisTech, Institut Polytechnique de Paris

Stochastic differential equations (SDEs) in the sense of McKean are stochastic differential equations whose coefficients do not only depend on time and on the position of the process solution but also on its marginal laws. Often they constitute probabilistic representation of conservative PDEs. The possibility of approaching them with particle systems provides a Monte-Carlo type approximation of the mentioned conservative PDEs. In this talk we will illustrate how the method can be adapted to the case of a class of non-conservative PDEs. The talk is based on recent work with A. Le Cavil, J. Lieber and N. Oudjane (see [10, 7, 6, 8, 9]) and on a survey of less recent wotk with Ph. Blanchard, V. Barbu, N, Belaribi, M. Röckner, see [5, 1, 11, 4, 3, 2].

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