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Gaussian-type density bounds for solutions of multidimensional backward SDEs and application to gene expression.

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Abstract

We obtain upper and lower Gaussian-type density bounds for the law for each component Y_t^i of the solution Y_t to a multidimensional backward SDE. Our approach is based on the Nourdin-Viens formula and the analysis of the associated semilinear parabolic PDE. To the best of our knowledge, the problem of density analysis for a backward SDE in the multidimensional setting is addressed for the first time. Further, we apply our results to stochastic gene expression; namely, we estimate protein levels of separate genes in a gene regulatory network. This talk is based on a joint work with Roman Chertovskikh (University of Porto).