

Time fractional equations and probabilistic representation

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Abstract

Time-fractional diffusion equations have been actively studied in several fields including mathematics, physics, chemistry, engineering, hydrology and even finance and social sciences as they can be used to model the anomalous diffusions exhibiting subdiffusive behavior, due to particle sticking and trapping phenomena. In this talk, I will report some recent progress in the study of general fractional-time parabolic equations of mixture type, including existence and uniqueness of the solutions and their probabilistic representations in terms of the corresponding inverse subordinators with or without drifts. Sharp two-sided estimates on the fundamental solution will be given. Fractional-time parabolic equations with source term will also be discussed. In particular, a new representation formula for the solution of time fractional Poisson equation will be presented, which does not involve fractional time derivative of the fundamental solution.