SEMI-FRACTIONAL DIFFUSION EQUATIONS

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It is well understood that certain fractional Cauchy problems can be solved by the densities of stable Lévy processes. Our aim is to get an analogous result for the more general class of semi-stable Lévy processes obeying a self-similarity property only on discrete scales. We introduce a new kind of fractional derivative taking into account the log-periodic perturbations of the Lévy measure. This enables us to give a solution to corresponding semi-fractional diffusion equations and numerical approximations by means of a Grünwald-Letnikov type formula.