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A Resummed Branching Process Representation for a Class of Nonlinear ODEs

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Abstract

We study some probabilistic representations, based on branching processes, of a simple nonlinear differential equation, i.e. $u'=lambda u(au^R-1)$. The first approach is basically the same used by Le Jan and Sznitman for 3-d Navier-Stokes equations, which need small initial data to work. In our much simpler setting we are able to make this precise, finding all the cases where their method fails to give the solution. The second approach is based on a resummed representation, which we can prove to give all the solutions of the problem, even those with large initial data.

Full text: PDF | PostScript

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