

# **The probabilistic parametrix method as a simulation method (tentative)**

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The probabilistic parametrix method as a simulation method Arturo Kohatsu-Higa Abstract The parametrix method created by E. Levi more than one hundred years ago is a standard method in order to obtain and study theoretical properties of solutions of partial differential equations. The parametrix method is a Taylor like expansion methodology that expresses the fundamental solution of such equations as an infinite sum of multiple integrals in time and space. When applying this methodology in order to find numerical approximations for solutions of partial differential equations the main problem is that one can not use the expansion up to a high order due to the increase in the calculation of multiple integrals in time and space.

In this setting, we propose to interpret the parametrix method in stochastic terms in order to allow the use of Monte Carlo simulation methods. This was presented in

Vlad Bally and Arturo Kohatsu-Higa, A probabilistic interpretation of the parametrix method, *Ann. Appl. Probab.*, to appear The results give a method to simulate expectations of functions without any weak error. If time allows, we will present the results in this paper and some possible extensions to other problems.