Analytical Expansions for Parabolic Equations

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Abstract

We consider the Cauchy problem associated with a general parabolic partial differential equation in d dimensions. We find a family of closed-form asymptotic approximations for the unique classical solution of this equation as well as rigorous short-time error estimates. Using a boot-strapping technique, we also provide convergence results for arbitrarily large time intervals.

Keywords

parabolic PDE | asymptotic expansion | singular perturbation | analytical approximation

MSC codes

35K10 | 74G10 | 91G20

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