



Universidad de Valladolid



Fundamental solutions for parabolic equations by Lie symmetry group methods

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Abstract: General linear parabolic PDEs in $(1+1)$ -dimension, in particular Fokker–Planck equations, arise in diverse areas such as diffusion processes, stochastic (Markov) processes, Brownian motion, probability theory, financial mathematics, population genetics, quantum chaos and others. The efficiency of Lie symmetry methods for constructing fundamental solutions (heat kernels) will be shown by way of examples like quantum harmonic oscillator (Mehler formula), the Ornstein–Uhlenbeck and Bessel processes and Kolmogorov equation, among others. A new criterion for transformability to canonical forms with four- and six- dimensional nontrivial symmetry groups will be presented.

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