KLEIN–GORDON OSCILLATOR USING GENERALIZED DUNKL DERIVATIVES IN THE PATH INTEGRAL FORMALISM

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Abstract

In this work, we study the Green's function of relativistic oscillator with spin-0 by employing the path integral formalism. Our analysis is carried out within the framework of a generalized Dunkl derivative characterized by three deformation parameters, which extends the conventional Dunkl operator. For simplicity, this generalized derivative is reformulated in terms of only two parameters, making the problem more tractable while preserving the essential features of the deformation. Within this setting, the energy spectra and the corresponding wave functions are explicitly derived as functions of the deformation parameters. Special attention is given to the role of these parameters in modifying the structure of the solutions, highlighting their influence on both the spectrum and the wave functions. Furthermore, we show that in the limiting

cases of the deformation, the system naturally reduces to the standard Dunkl derivative model. Remarkably, this recovery occurs even in the absence of Dunkl parameters, thereby confirming the consistency of our generalized framework with the conventional theory.