Supersymmetric Approach Applied to the von Ross's Position Dependent Mass Hamiltonian*.

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The application of position-dependent mass (PDM) Hamiltonians in the study of position-dependent chemical composition systems, many body problems, semiconductors, quantum dots, etc, has attracted considerable attention. To that, the starting point has been the PDM von Ross's kinetic-energy operator that presents a mathematical challenge associated with the ordering ambiguity. At this regard, almost all proposals are based on the BenDaniel's and Duke's particular operator and then generalized from it to other ones. In this work, an alternative supersymmetric method to obtain straightforwardly the solutions of Hamiltonians for particles endowed with PDM is presented. The proposed method is based on a proper pair of operators that allows overcome the difficulties to build a supersymmetric approach for the involved problem. As an example of the usefulness of the proposal, we consider the exactly solvable problems for any particular selection of the kinetic energy operator such as those of BenDaniel's and Duke's, Gora's and William's, Zhu's and Kroemer's, Li's and Kuhn's, and so on. That is, the proposed approach is useful to improve the resolution of the PDM Schrödinger equation in its different areas of applicability such as condensed matter systems or electronic heterostructures with variable composition and in quantum chemical calculations.