Generation of exact analytic solution of position-dependent mass Schrodinger equation

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Extended Transformation, a method of mapping a known system into a new system is applied to generate exact analytic solution of position-dependent mass Schrodinger equation. Some exactly solvable potentials are taken as known systems and the first order transformation is performed on D-dimensional radial Schrodinger equation with constant mass providing exactly solvable potentials equipped with energy eigenvalues and corresponding wave functions for different choices of mass functions for each known system. The transformation is performed on D-dimensional radial position-dependent mass.

Schrodinger equation also where the systems with mass functions generated in the first order transformation are taken as known systems. The important fact is that the solutions which are meant for central potential with radially symmetric mass functions are fitted for "Zhu and Kroemer" ordering of ambiguity. Another result is that all the wave functions corresponding to non-zero energy eigenvalues are normalizable and the normalizability condition of the wave functions remains independent of mass functions. Thirdly, some of the generated potentials show a family relationship among themselves where power law potentials also get related to non-power law potentials and vice versa through the transformation.

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