

An investigation of Discrete energy spectrum of Newton's equivalent asymmetrical finite square well

In this work, we want to find out the bound states and energies of the Newton's equivalent quantum mechanics (NEQM) which construct from 1-parameter family (β) of Newton's equivalent Hamiltonian (NEH) in asymmetrical finite square well system. Classically, NEH is Hamiltonian which is equivalently to standard one yielding the same Newton's equation. In quantum system, by ordering problem of \hat{x} and \hat{p} , there are difference to original Schrodinger equation. Schrodinger equation which base on NEH becomes infinite order differential equation. Corresponding wave function and boundary matching conditions must be infinite order. In this work, there are three different regions, characterized by the value of the potential, the first is $V_0, V_0 > 0$, the second is $V = 0$, and the third is $V, V > V_0$. For bound state regions, we expected discrete energy characterized by value β . Finally, we plot between the energy level and β by fixing and changing the potential values to study behavior of the system which beta effect to the energy.

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