

A note on reformed ladder operators for noncommutative morse oscillator

ABSTRACT

Morse oscillator is one of the known solvable potentials which attracts many applications in quantum mechanics especially in quantum chemistry. One of the interesting results of this study is the generation of ladder operators for Morse potential. The operators are a representation of the shifting energy levels of the states exhibited by the wave function. From this result, we manipulate and deform the operators in such a way that it gives a noncommutative property to promote noncommutative quantum mechanics (NCQM). The resultant NC feature can be shown in the spatial coordinates and finally the Hamiltonian. In this study, we consider two-dimensional Morse potential where the ladder operators are in the form of the corresponding 2D Morse.

Keyword: Non-commutative quantum mechanics; Morse oscillator; Operator method; Ladder operators