Equivalent Hermitian Hamiltonians for some non-Hermitian Hamiltonians

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Abstract

Six years ago, by using operator techniques and path-integral methods, it was shown that the complex non-Hermitian PT-symmetric Hamiltonian p2-gx4 is equivalent to a conventional Hermitian Hamiltonian p2+4gx4-2 √gx. Further it was revealed that the linear term in the Hermitian Hamiltonian is anomalous in the sense that it has no classical analog. In this paper we show that the complex non-Hermitian PT-symmetric Hamiltonian p2-gx4+4i √gx and the conventional Hermitian Hamiltonian p2+4gx4+6 √gx have the same eigenspectra. In this case, the anomalous terms in both Hamiltonians are different from the previous one and vanish in the semiclassical limit. Further these equivalent Hamiltonians have zero-energy ground states. The exact ground-state wave functions and supersymmetric partner potentials are derived.

Indexed keywords

Eigenspectra; Ground state wavefunctions; Hermitians; Linear terms; Non-Hermitian Hamiltonians; Path integral method; Semiclassical limit

Engineering controlled terms: Ground state; Platinum compounds

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