Reality of Energy Spectra in Multi-dimensional Hamiltonians Having Pseudo Hermiticity with Respect to the Exchange Operator

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Abstract *The pseudo Hermiticity with respect to the exchange operators of N-D complex Hamiltonians is investigated. It is shown that if an N-D Hamiltonian is pseudo Hermitian and any eigenfunction of it retains $\pi_\alpha T$ symmetry then the corresponding eigen value is real, where π_α is an exchange operator with respect to the permutation α of coordinates and T is the time reversal operator. We construct a special class of N-D pseudo Hermitian Hamiltonians with respect to exchange operators from both N/2-D and N-D general complex Hamiltonians. Examples are presented for Hamiltonians with πT symmetry ($\pi : x \leftrightarrow y$, $p_x \leftrightarrow p_y$) and the reality of these systems are investigated.*

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