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Application of Coordinate-Momentum Intermediate Representation in Solving Eigenstate Problem of a Coupled Oscillator System

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Abstract: We study the eigenstate problem of a kind of coupled oscillators in the new quantum mechanical representation $|q,\mu,\nu\rangle$, which is defined as the eigenvector of the operator ($\mu Q+\nu P$), where μ and ν are two real parameters. We also use the U operator transformation method to deal with the same problem. We obtain the normally ordered product expressions of U operator and eigenvector. It is shown that the ground state of system Hamiltonian is a squeezed state.

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Key words: coordinator-momentum intermediate representation, coupled oscillator, operator transformation method