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Realizations of the osp(2,1) Superalgebra and Related Physical Systems

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Abstract: Eigenvalues and eigenfunction of two-boson 2×2 Hamiltonians in the framework of the superalgebra osp(2,1) are determined by presenting a similarity transformation. The Hamiltonians include two bosons and one fermion have been transformed in the form of the one variable differential equations and the conditions for its solvability have been discussed. It is observed that the Hamiltonians of the various physical systems can be written in terms of the generators of the osp(2,1) superalgebra and under some certain conditions their eigenstates can exactly be obtained. In particular, the procedure given here is useful in determining eigenstates of the Jaynes-Cummings Hamiltonians.