

Abstract Submitted
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Increasing the coupling constant range of perturbative approximations for ground state and excited state energies for the anharmonic oscillator SAMUEL BOWEN, Chicago State University, JAY D. MANCINI, Kingsborough College of CUNY, VASSILIOS FESSATIDIS, Fordham University — A perturbative interpolation scheme related to Feenberg’s earlier perturbation theory ideas has been applied to the ground state and excited state energies of the anharmonic oscillator. For each energy level a single parameter can be adjusted to increase the close agreement between the interpolated energy level and the “exact” energy (determined by direct diagonalization of a large Hamiltonian matrix). The adjustment of this parameter can increase the range of agreement by a factor of 1000 in the coupling constant over the range in which standard perturbation theory applies. Several examples of extended agreement for different states will be presented and an attempt to determine this adjustable parameter apriori using small matrix truncations will be described as will applications of these ideas to other simple Hamiltonians.

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