THE MULTIPLE DAVYDOV TRIAL STATES: FORMULATION AND APPLICATIONS

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Numerically exact in the limit of a large multiplicity, the multiple Davydov trial states grew out of the Davydov solitons in the 1980s. In particular, the multi-D2 ansatz is capable to handle various forms of particle-boson interactions in a many-body system. A highly competitive alternative to methods such as NRG, HEOM, and QUAPI, time-dependent variation with the multi-D2 ansatz has found applications in a variety of problems ranging from one- and two-impurity spin-boson models, dissipative Landau-Zener transitions, driven Rabi dimers, to singlet fission dynamics, super bloch oscillations, multidimensional spectroscopy of molecular aggregates, and dissipative dynamics at conical intersections.