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Computing energy spectra for quantum systems using the Feynman-Kac path integral method J.M. REJCEK, N.G. FAZLEEV, Department of Physics, University of Texas at Arlington — We use group theory considerations and properties of a continuous path to define a failure tree numerical procedure for calculating the lowest energy eigenvalues for quantum systems using the Feynman-Kac path integral method. Within this method the solution of the imaginary time Schrödinger equation is approximated by random walk simulations on a discrete grid constrained only by symmetry considerations of the Hamiltonian. The required symmetry constraints on random walk simulations are associated with a given irreducible representation and are found by identifying the eigenvalues for the irreducible representations corresponding to the symmetric or antisymmetric eigenfunctions for each group operator. The numerical method is applied to compute the eigenvalues of the ground and excited states of the hydrogen and helium atoms.

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