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Computing Energy Spectra for Quantum Systems Using the Feynman-Kac Path Integral N.G. FAZLEEV, J.M. REJCEK, J.L. FRY, University of Texas at Arlington — A method for calculating the first few energy eigenvalues for quantum systems using the Feynman-Kac path integral is presented. The exact analytical solution of the Feynman-Kac path integral for the infinite square well is presented and compared with numerical simulations approximated by random walk simulations on a discrete grid. Using the Laplace transform of the Feynman-Kac path integral and knowing the form of the eigenvalue expansion of the integral, it is possible to calculate the first few energy eigenvalues within an estimated uncertainty. The method provides exact values in the limit of infinitesimal step size and infinite time for the ground state.

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