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Developing integration and extrapolation methods for no-core configuration interaction calculations[1] ALEXA I. RAKOSKI, MARK A. CAPRIO, University of Notre Dame — A study of the states of light nuclei in the no-core shell model is limited by the size of basis for which calculations are possible, but the results for small, calculable bases can be extrapolated to larger basis size. To understand the properties of this extrapolation, one-dimensional models in the harmonic oscillator and Coulomb-Sturmian bases are explored because of the relative ease of calculations. Using a linear algebra approach to solving Schrodinger's equation, the wave function can be determined in these models and observables such as energy and radius can be calculated. However, the integrals required for this process become cumbersome to evaluate using standard numerical methods for large basis size even in the one-dimensional model. Alternate numerical techniques are tested to determine the most effective in extending the calculations to larger basis size, and extrapolation methods within the model are explored.

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