Abstract Submitted
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Lagrange Meshes in Nuclear Physics TAYLOR HYNDS, Florida State University — We examine different methods of solving the Schrödinger equation for two and three-body systems. We begin by constructing variational wave functions, as expansions in a basis of orthogonal polynomials. This method has been found to give accurate results, given a sufficiently large basis. However, computationally this can become very cumbersome. We therefore employ the Lagrange-mesh method, which leads to a simple calculation of both potential and kinetic matrix elements that is both computationally efficient and results in little to no loss in accuracy. This method has been applied to several problems with well known analytical solutions, and has given excellent results. The effectiveness of this method in analyzing bound states of quarks has yet to be demonstrated. In the future this method will be applied to the quantum-mechanical three-body problem in an effort to better understand the structure of various nuclei.

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