

### **Abstract**

This report addresses different numerical methods for solving a six-dimensional integral. The integral of interest is the energy between two electrons in a helium atom repelling each other, due to the Coloumb interaction. We assume that the wave function for each electron can be modelled like the single-particle wave function of an electron in the hydrogen atom. Solving this integral is done using Gaussian-Quadrature with Legendre and Laguerre polynomials, as well as two approaches to the Monte Carlo method of integration. The standard deviation of these solutions are also calculated. In addition to this, every procedure is timed for comparison.