

Project 3

Anna Stray Rongve
Knut Magnus Aasrud
Amund Midtgard Raniseth

October 10, 2019

Abstract

Ever done numerical integration? Well we will do it test

1 Introduction

this is intro

2 Theory

2.1 Improved Gauss-Quadrature

While the Gauss-Legendre quadrature gets the job done, its not a pretty sight. What can be improved is to replace the Legendre polynomials with the Laguerre polynomials. These polynomials are defined for $x \in [0, \infty)$.

We will change our original integral from cartesian coordinates to spherical, thus the following relations:

$$d\vec{r}_1 d\vec{r}_2 = r_1^2 dr_1 r_2^2 dr_2 d\cos(\theta_1) d\cos(\theta_2) d\phi_1 d\phi_2$$

$$\frac{1}{r_{12}} = \frac{1}{\sqrt{r_1^2 + r_2^2 - 2r_1 r_2 \cos(\beta)}}$$

$$\cos(\beta) = \cos(\theta_1)\cos(\theta_2) + \sin(\theta_1)\sin(\theta_2)\cos(\phi_1 - \phi_2)$$

3 Discussion

4 Conclusion

this is a reference to intro: 1