

# Linear algebra in computational physics

PROJECT 1

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# 1 Abstract

## Contents

|                        |          |
|------------------------|----------|
| <b>1 Abstract</b>      | <b>2</b> |
| <b>2 Introduction</b>  | <b>3</b> |
| <b>3 Methods</b>       | <b>4</b> |
| <b>4 Results</b>       | <b>4</b> |
| <b>5 Discussion</b>    | <b>4</b> |
| <b>List of Figures</b> | <b>5</b> |
| <b>List of Tables</b>  | <b>5</b> |

## 2 Introduction

Solving differential equations is an integral part of the physical sciences, since most differential equations cannot be solved analytically, they are solved numerically. Large scale models, like climate models or many-body systems, often consist of many complex coupled differential equations. In this report we compare two numerical methods of solving differential equations. More specifically, we solve Poisson's equation

$$\frac{d^2\phi}{dr^2} = -4\pi r\rho(r), \tag{2.1}$$

using both gaussian elimination and LU-decomposition (see ??).

### **3 Methods**

### **4 Results**

### **5 Discussion**

## List of Figures

## List of Tables