Lab2

September 11, 2023

Abstract

In the present laboratory exercise, you are instructed to implement two distinct methods for **matrix multiplication**: **Strassen's algorithm** and **ordinary algorithm**. You are encouraged to undertake a comprehensive analysis of both algorithms, encompassing both theoretical frameworks and empirical validation through experimentation.

1 Introduction

The Strassen algorithm, attributed to Volker Strassen, represents an enhanced approach to matrix multiplication, utilizing a divide-and-conquer strategy for optimization. The algorithm exhibits a computational complexity of $\Theta(n^{2.81})$ as opposed to $\Theta(n^3)$. While the difference between 2.81 and 3 may appear negligible, it is important to note that this variation occurs in the exponent, thereby leading to a substantial impact on the algorithm's running time. In practical terms, Strassen's algorithm outperforms the conventional cubic-time algorithm for input sizes $n \geq 32$ on contemporary computing machinery.

2 The Tasks

2.1 Implementation

Write code for Strassen's and ordinary algorithms.

2.2 Experiment

Evaluate the empirical cost associated with the implementation of the algorithms to determine its alignment with the theoretical computational complexity.

2.3 Documentation

All document for the answers of the above questions

3 Points for Attention

(1) For the implementation of these algorithms, you are free to select a programming language of your choice.
(2) Kindly upload the source code files along with their associated documentation in a compressed ZIP format to the elearning system for assessment.
(3) The deadline of this lab is 23:59:59 on Spetember 15.
(4) If you have any questions please feel free to contact teaching assistants.