

UNIVERSITÀ DI PISA

DEPARTMENT OF COMPUTER SCIENCE

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# SPM Final Project Report

The Jacobi Iterative Method

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# 1 Introduction

The aim of this project was to produce a program to solve linear systems using the Jacobi method.

Three different implementations are proposed here:

**Sequential implementation** the sequential implementation provides a vanilla implementation of the Jacobi method,

**Thread implementation** is a naïve implementation of the algorithm using threads from C++11 standard,

**FastFlow implementation** is an implementation using the `parallelFor` from FastFlow library.

Tests were conducted on a machine using a *Intel Xeon E2650* CPU (8 cores clocked at *2GHz* each with 2 contexts) and a *Intel Xeon Phi* co-processor (60 cores clocked at *1GHz* each with 4 contexts).

**Summary.** The next section discusses the details of program design, including theoretical analysis of the expected performance of the parallel implementation. In Section 3 reports details about the implementation, discussing main aspects of the code and its optimization. Section 4 is divided in two sub-sections. The first sub-section discusses the methodology for the experiments and chosen parameters, while the second sub-section reports the experimental results in the form of tables and graphs. Section 5 includes the user manual for the program, and indications on how to reproduce results reported here. Finally Section 6 compares obtained results against the expected ones.

## 2 Design

## 3 Implementation

## 4 Experiments

### 4.1 Methodology

### 4.2 Results

## 5 User guide

## 6 Conclusion