Systems of Linear Equations

Exercise 7

Systems of Linear Equations Report

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1 Introduction

The purpose of this exercise is to use solve a linear system using LU decomposition.

2 Tools

The following programming language and libraries have been used in this exercise:

- C
- GSL (GNU Scientific Library)

The following GSL data types have been used in the exercise:

- `gsl_vector`
- `gsl_matrix`
- `gsl_permutation`

The following GSL methods have been used in the exercise:

- `gsl_matrix_alloc(size1, size2)`
- `gsl_matrix_set_zero(matrix)`
- `gsl_matrix_set(matrix, row, column, value)`
- `gsl_matrix_get(matrix, row, column)`
- `gsl_vector_alloc(size)`
- `gsl_vector_set_zero(vector)`
- `gsl_vector_set(size)`
- `gsl_vector_get(vector, index)`
- `gsl_permutation_alloc(size)`

In order to factorize a matrix into the LU decomposition, and then solve the square system $Ax = b$ using the decomposition of A, I've used the following methods:

- `gsl_linalg_LU_decomp(A, permutation, signum)`
- `gsl_linalg_LU_solve(LU, permutation, b, x)`

3 Computation and plotting

4 Observations