

## Homework #5 (NQe311, Spring, 2020)

KAIST

(Due April 29)

1. Let's consider a *tridiagonal matrix* problem:  $\mathbf{Ax} = \mathbf{b}$ . Assume that  $n \times n$  matrix  $\mathbf{A}$  is diagonally dominant. Taking advantage of the properties of  $\mathbf{A}$ , write a computer program based on the successive over-relaxation (SOR) method to find  $\mathbf{x}$ . Run the SOR program to solve the following problem:

$$\begin{pmatrix} 2 & -1 & & \\ -1 & 2 & -1 & \\ & -1 & 2 & -1 \\ & & -1 & 2 \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \\ 3 \\ 4 \end{pmatrix}$$

You are supposed to find the **optimal** relaxation parameter  $\omega$ ,  $1 < \omega < 2$ .