Numerical Methods, 2017 Spring

# Assignment 2
# Due on April 6

1. (25%) Chapter 2: Exercise 18

2. (25%) Chapter 2: Exercise 35 (Please submit your code to E3)

3. (25%) Chapter 2: Exercise 81

4. (10%) Find a good value of the overrelaxation factor that speeds the convergence of Exercise 81(b) most by trying different values.

5. (15%) Compute the condition number of the following matrices and classify each of them as well-conditioned or ill-conditioned.

(a) $\begin{bmatrix} 10^{10} & 0 \\ 0 & 10^{-10} \end{bmatrix}$ (b) $\begin{bmatrix} 10^{10} & 0 \\ 0 & 10^{10} \end{bmatrix}$ (c) $\begin{bmatrix} 10^{-10} & 0 \\ 0 & 10^{-10} \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$

6. (15%) (Bonus) Derive an algorithm and write an MATLAB program to solve a linear system **Ax**=**b,** where **A** is an *N*x*N* band matrix with bandwidth *W*. You can generalize the algorithm you develop in Exercise 35 to handle a band matrix. Please upload your code to the E3 web.