

Numerical Methods I

Lab Session 3

September 25, 2003

Consider the example given in class:

$$A = \begin{pmatrix} \varepsilon & 1 \\ 1 & 1 \end{pmatrix}, \quad \mathbf{b} = \begin{pmatrix} 1 + \varepsilon \\ 2 \end{pmatrix},$$

where the exact solution to the linear system $A\mathbf{x} = \mathbf{b}$ is

$$\mathbf{x} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}.$$

1. Solve this equation using Octave via its LU decomposition for $\varepsilon = 10^{-k}$ for $k = 2, \dots, 18$.

Hint: `help logspace`

2. Divide the first equation by ε . Does the accuracy improve?