Problem Set

Chapter 04.06
Gauss Elimination

1. Use Naïve Gauss elimination to solve

$$4x_1 + x_2 - x_3 = -2$$
$$5x_1 + x_2 + 2x_3 = 4$$
$$6x_1 + x_2 + x_3 = 6$$

2. Assume that you are using a computer with four significant digits with chopping. Use Naïve Gauss elimination method to solve

$$4x_1 + x_2 - x_3 = -2$$
$$5x_1 + x_2 + 2x_3 = 4$$
$$6x_1 + x_2 + x_3 = 6$$

3. For

$$[A] = \begin{bmatrix} 10 & -7 & 0 \\ -3 & 2.099 & 6 \\ 5 & -1 & 5 \end{bmatrix}$$

Find the determinant of [A] using forward elimination step of naïve Gauss elimination method.

4. At the end of forward elimination steps using naïve Gauss elimination method on the coefficient matrix

$$[A] = \begin{bmatrix} 25 & c & 1 \\ 64 & a & 1 \\ 144 & b & 1 \end{bmatrix}$$

[A] reduces to

$$[B] = \begin{bmatrix} 25 & 5 & 1 \\ 0 & -4.8 & -1.56 \\ 0 & 0 & 0.7 \end{bmatrix}$$

What is the determinant of $[A]$?

5. Using Gaussian elimination with partial pivoting to solve

$$4x_1 + x_2 - x_3 = -2$$
$$5x_1 + x_2 + 2x_3 = 4$$
$$6x_1 + x_2 + x_3 = 6$$

6. Assume that you are using a computer with four significant digits with chopping, use Gaussian elimination with partial pivoting to solve

$$4x_1 + x_2 - x_3 = -2$$
$$5x_1 + x_2 + 2x_3 = 4$$
$$6x_1 + x_2 + x_3 = 6$$