ESO 208A: Computational Methods in Engineering

Tutorial 4

Round-errors and partial pivoting

1. Use Gauss elimination method and four-digit floating point arithmetic with rounding to solve:

$$0.003x + 59.14y = 59.17$$
$$5.291x - 6.130y = 46.78$$

2. Solve the previous problem by using Gauss elimination with partial pivoting and four-digit rounding arithmetic.

Matrix Decomposition

3. Solve the following system of linear equation by using (i) Gauss elimination, (ii) Doolitte decomposition, (iii) Crout decomposition, (iv) Thomas algorithm, and (v) Cholesky decomposition.

$$5x_1 + x_2 = 7$$
$$x_1 + 5x_2 + x_3 = 14$$
$$x_2 + 5x_3 = 17$$