MATH 3043, Numerical Analysis I
Fall 2018

Lab 9

This lab will have you implementing Gaussian elimination with pivoting to solve linear systems.

Solutions must be submitted on Canvas and are due **November 12** at the beginning of lab. Please submit a single script file `Lab9Lastname.m` and the corresponding published file `Lab9Lastname.pdf` (for example, my submitted files would be `Lab9Zumbrum.m` and `Lab9Zumbrum.pdf`). Each solution should

- be contained in a separate cell which includes the problem number and short problem description,
- run independent of other cells,
- be adequately commented.

1. Implement Gaussian elimination with partial pivoting to solve

$$\begin{aligned} 2x_1 &+ x_3 - x_4 = 6 \\ 6x_1 + 3x_2 &+ 2x_3 - x_4 = 15 \\ 4x_1 + 3x_2 - 2x_3 &+ 3x_4 = 3 \\ -2x_1 - 6x_2 + 2x_3 &- 14x_4 = 12. \end{aligned}$$

2. Implement Gaussian elimination with scaled partial pivoting to solve

$$\begin{aligned} \pi x_1 + \sqrt{2}x_2 - x_3 + x_4 &= 0 \\ ex_1 - x_2 + x_3 + 2x_4 &= 1 \\ x_1 + x_2 - \sqrt{3}x_3 + x_4 &= 2 \\ -x_1 - x_2 + x_3 - \sqrt{5}x_4 &= 3. \end{aligned}$$