In this class:

- **Solving** $Ax=b$ with Gaussian Elimination and LU and partial pivoting

**Solving $Ax=b$ with Pivoting**

Next class

Operations in solving $Ax=b$

G&C – Chapter 7

Next next class

QR Factorization & Least Squares

G&C – Chapter 7.6
Solving $Ax = b$

We use Gaussian Elimination to solve $Ax = b$

We record the steps in a matrix factorization

$$A = LU$$

So that we can “replay” them more efficiently.
Solving $Ax=b$

But – there are some issues with this!

- Pivoting is necessary to make this work on the computer!
- Swapping rows to avoid dividing by (i) zero or (ii) small numbers

**THEOREM** A matrix is non-singular if and only if the pivoted LU decomposition succeeds without dividing by zero