Homework 2 for
MSAN 502, Review of Linear Algebra

Due: Wednesday, July 27, 11:59pm

Strang Problems (4th edition)

Problem Set 2.5: Do problems 11, 25(A only), 29
Problem Set 2.6: Do problems 7, 9, 10, 16, 19
Problem Set 3.1: Do problems 4, 9ab, 10, 17a, 19, 20, 23, 26 (don't worry these are very short)
Problem Set 3.2: Do problems 1-4 for (a) only, 9, 21, 26, 27
Problem Set 3.3: Do problems 2(a), 8 (for A,B only), 17
Problem Set 3.4: Do problems 4, 6(a), 13, 22

Problem: Determine how many multiplications and additions are required to multiply an $m \times n$ matrix and an $n \times r$ matrix. How many multiplications (we can ignore additions) are needed to find ABC if A is 2×4, B is 4×7, and C is 7×10?

Python Problems

1. Modify and clean up you eliminate.py function from last homework. It should
   (a) Handle $n \times n$ matrices for all n.
   (b) Solve $Ax = b$ when there is a *unique solution*, including if a permutation of rows is needed.
   (c) End and state there was an error if your eliminate.py algorithm fails NOT if you use a rank check or any other lin.alg check.
2. Test the complexity of your algorithm run time. Do so by doing 10 runs of random matrices of size 2^k, for $k = 2...12$. Let T_k = average time for a matrix of size 2^k. Plot the $\log_2(T_k)$ against k. How can we tell the leading order complexity from this plot?