Computing Assignment 3

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# What I did:

Chart, line chart

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Description automatically generatedFor my values of N, I chose 500, 600, 700, 800, 900, 1000, 1250, 1500, 1750, 2000, as we want large N for accurate flop counts and any number greater than 2000 increases computing time substantially. Then, for my number of trials (M) I chose 500, as this is the maximum number of trials that yields total a total runtime of under 5 minutes and seems high enough to get consistent results. I then, for each matrix provided in the assignment, calculated the average runtime of Gaussian Elimination (G.E) for each N over M. I then plotted log(N) vs log(mean error) for each matrix provided in the assignment. After plotting, I fitted a liner line to each graph, and computed the slopes of each line. The graphs containing the linear lines of these slopes can be found below, as well as the computed slopes of each line.

Chart, line chart

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# Comparison of results:

1. We know the runtime of Gaussian Elimination on a random matrix to theoretically be O() . Flops as we know stands for floating point operations per second.
2. We know the runtime of Gaussian Elimination on a random, diagonally dominant matrix to theoretically be O() , as no pivoting needs to take place.
3. We know the runtime of Gaussian Elimination on a random, upper triangular matrix to theoretically be O()