

AMATH 352, FINAL EXAM
DUE THURSDAY, AUGUST 21
BY 5:00PM

Instructions

Rules/Guidelines:

- Work independently.
- Only use basic Matlab functionality in your code. (For example, no using the built-in `polyfit` to do polynomial interpolation for you.)
- Feel free to re-use code from earlier in the course, but include anything you use with your exam.

Turning in:

- The envelope on the 4th floor of Guggenheim will be available for your written work. But feel free to type up the written problems and email them to me, if you'd rather.
- Turn in your code via email, as usual.

If you have any questions, feel free to email me. I won't say much about mathematical issues, but if you run into any Matlab errors you can't figure out, I'll be happy to help. Good luck!

Written Part

Problem 1. Find matrix representations for the following two transformations, which perform Gaussian operations on an $r \times r$ matrix A :

Write a program called `trisolve.m` that solves a tridiagonal system $A\mathbf{x} = \mathbf{b}$ as follows:

- As inputs, takes the vectors \mathbf{u} , \mathbf{v} , and \mathbf{w} that define A , along with the vector \mathbf{b} .
- As output, produces \mathbf{x} that solves $A\mathbf{x} = \mathbf{b}$.
- Does all calculations using only the vectors \mathbf{u} , \mathbf{v} , \mathbf{w} , \mathbf{b} , and \mathbf{x} . Specifically, the full matrix A is never formed.

You may assume that the system is solvable, and that no row-swapping is needed. (This is true if, for example, A is **diagonally dominant**, meaning that the diagonal element in each row has larger magnitude than the sum of magnitudes of all other elements in the row.)