

# Graded Homework 3 Numerical Linear Algebra 2026

The solutions are due By the End of Final Exam Week

## Programming Exercise

Implement a unified incremental (Givens rotation-based) approach to FOM and GMRES, i.e., the code should be able to select one or the other. Demonstrate and compare the behavior of the two approaches with your code. In particular, verify the relative behavior of the two methods on the example problem in Study Question Set 3 Problem 6 that stagnates until the last iteration and others of your own design. You need not use preconditioning and should use the ratio  $\|r_i\|_2/\|r_0\|_2$  as the stopping criterion. For problems where you know the true solution also examine the behavior of  $\|x_i - x\|$ . You need not write the code using sparse primitives but it is encouraged that you do so in order to enable your testing of large problems.

Include a description of your testing procedure and your results.