MATH 568
Linear Inverse Methods, Homework
Due March 15 (before class)

Complete Exercise 7. in Chapter 4 of your textbook, which is to solve the linear vertical gravity anomaly inverse problem in Example 1.4. The supporting file **gdata.mat** may not be available on the GitHub site, but it is available in Canvas in the Regularization folder. The textbook says to use the L-curve, instead each group will use a different regularization parameter selection method:

Yemi and Evi	L-curve
Ibrahim and Sandra	Discrepancy Principle
Patricia and Yao	Regularized Discrepancy Principle
Habeeb and Brian	TGSVD
Hang and Michael	GCV

Please answer the questions in the textbook, and in addition:

7 (a) Interpret the results of your least squares inversion, and analyze the resolution in your model parameter estimates.

(b) Use your regularization parameter selection method as indicated in the above table, which may not be the L-curve. In addition to second-order, invert using zeroth- and first-order Tikhonov regularization. Discuss the model parameter estimates for each method, and compare them to the least squares estimates.

(c) Show results when inverting by just adding bounds to the least squares problem (Section 4.9 and textbook function **bvls**). Then invert using the bounds and second-order Tikhonov regularization. In each case interpret the results of your inversion, and analyze the resolution in your model parameter estimates.

(d) Include in your discussion results from zeroth- and first-order Tikhonov regularization.