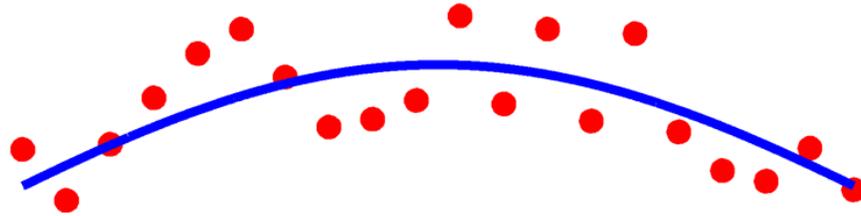


Name: _____ (please print clearly)

EE 4386/5301



Computational Methods in EE

Exam #2 (Take Home)

Instructor

Dr. Raymond C. Rumpf

Due March 20, 2018

General Instructions

Answer all the questions in the order they are asked. Provide all MATLAB codes in an Appendix. Complete and sign a graphics checklist and attach it as the last page of your submission.

Problem #1 (30%): Gauss-Jordan Method

Calculate the inverse of the following matrix using the Gauss-Jordan method.

$$\mathbf{Q} = \begin{bmatrix} -5.6 & 8.7 & -9.3 & -9.8 \\ -9.1 & -2.3 & -8.9 & -2.3 \\ 3.6 & 0.4 & 0.6 & -8.7 \\ 3.6 & 6.6 & 3.4 & -1.7 \end{bmatrix}$$

Show all intermediate steps and list each operation being performed. Be specific when listing the operations by identifying the specific row being operated on and any numbers being used in the operation. For example, the first two steps of your answer might look like...

Build augmented matrix:

```
-5.6000    8.7000   -9.3000   -9.8000    1.0000         0         0         0
-9.1000   -2.3000   -8.9000   -2.3000         0    1.0000         0         0
 3.6000    0.4000    0.6000   -8.7000         0         0    1.0000         0
 3.6000    6.6000    3.4000   -1.7000         0         0         0    1.0000
```

Divide Row 1 by -5.6:

```
1.0000   -1.5536    1.6607    1.7500   -0.1786         0         0         0
-9.1000   -2.3000   -8.9000   -2.3000         0    1.0000         0         0
 3.6000    0.4000    0.6000   -8.7000         0         0    1.0000         0
 3.6000    6.6000    3.4000   -1.7000         0         0         0    1.0000
```

Problem #2 (30%): Root Finding

Find where the function `ex2func()` equals exactly 5. Report your answer to ten digits of precision, no more and no less. You will be graded heavily on the accuracy of your answer.

Problem #3 (40%): Curve Fitting

A digital oscilloscope was used to capture voltage data from an electrical circuit. The data is saved in the MATLAB data file `ex2dat.dat` in the arrays `t` and `f`. The array `t` contains the time stamps of the measured data in seconds. The array `f` contains the measured values of voltage at each of the time stamps.

Fit this measured data to a symbolic equation of your design. Justify your choice of equation. Include any derivations you perform to obtain your answer. Provide a professional visualization of the raw data and the curve you have fit to that data. Include the symbolic function and the values of its coefficients as an inset to your figure. Provide all of this information in a single figure.