EGR 272 Due date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Circuit Theory II

File: N272M4A

**MATLAB Assignment #4 – Frequency Response**

General notes for all MATLAB programs:

* Write programs (.m files) – do not use the Command Window.
* Begin all programs with a block of comments including name, course number, assignment number, problem, and a brief description of the problem.
* All required MATLAB outputs and/or graphs should be nicely formatted.

**Reference:** Refer to the following lecture on the course website:

***EGR 272 - Frequency Response using MATLAB***

For each transfer function below, A, B, C, and D are calculated from your StudentID. Show your ID and the values of A, B, C, and D in your report.

* A = Digits 1-3 (3 digits) of Student ID in rad/s
* B = Digits 2-5 (4 digits) of Student ID in rad/s
* C = Digits 3-6 (4 digits) of Student ID in rad/s
* D = Digits 5-7 (3 digits) of StudentID in rad/s

**Example**: For the student ID 5470629:

A = 547 rad/s, B = 4706 rad/s, C = 7062 rad/s, D = 629 rad/s

**Frequency Response – Problem 1**

For the transfer function below:



1. Show the transfer function in “standard form”
2. Form two graphs: the Bode LM plot and the Bode phase plot ***by hand*** using 2, 3, or 4 cycle semi-log graph paper (available on the course website).
   * Add accurate axis labels and titles
   * Clearly label each break frequency
   * Label all levels in dB (or degrees) and all slopes in dB/dec (or deg/dec).
3. Write a MATLAB program to graph the LM response and the phase response for the transfer function shown below ***using the abs( ) and angle( ) functions in MATLAB*** (i.e., do not use the bode( ) function). Let w vary over the same range used in the Bode LM and phase plots above. The graphs should be nicely labeled and include gridlines. Use a log scale for w.
4. Compare the LM graphs from parts B and C. Discuss any differences.
5. Compare the LM graphs from parts B and C. Discuss any differences.

**Frequency Response – Problem 2**

For the transfer function below:



1. Show the transfer function in “standard form”
2. Form the Bode LM (no phase plot) ***by hand*** using 2, 3, or 4 cycle semi-log graph paper (available on the course website).
   * Add accurate axis labels and a title
   * Clearly label each break frequency
   * Label all levels in dB and all slopes in dB/dec.
3. Write a MATLAB program to graph the LM response and the phase response for the transfer function shown below ***using the tf( ) and bode( ) functions in MATLAB*** (i.e., do not use the bode( ) function). Let w vary over the same range used in the Bode LM plot above. The graphs should be nicely labeled and include gridlines. Use a log scale for w.
4. Compare the LM graphs from parts B and C. Discuss any differences.
5. Discuss the Bode phase plot. Does it look correct? Are the starting and ending phase values what you would expect?