USAF Academy
Department of Electrical and Computer Engineering
ECE 332 – Electrical Circuits and Systems II

Spring 2017

RLC Circuit Design – Prelab

(Due at beginning of class IAW syllabus. Make a copy for yourself)

Authorized Resources: 1) ECE332 course documents; and 2) course text.

Collaboration Policy: None. This is individual effort.

(25 pts) Theory

1. Develop and solve the ODE for the series RLC circuit due to a step input of amplitude of V_A. Be sure to account for the signal resistance R_{sig} and inductor's parasitic resistance R_L as part of your total circuit resistance R_T.

2. Develop and write down the governing equations relating damping factor ζ and undamped natural frequency [Hz], f_0, to part values R, L, and C.

(25 pts) Design

Through hand calculations using the governing equations above, design your circuit for R, L, C, and V_A to meet Specifications given in the lab handout. Ensure you use standard parts available in the lab as listed on the course website.

(25 pts) Simulation

Attach your MultiSim simulation (circuit schematic and graph) and Matlab simulation (graph). Fill in the table below showing your MultiSim values for the Specifications.

Parameter	Specifications	Calculation	% Error	Simulation	% Error
ζ (dimensionless)					
f_0 (kHz)					
Final Value (V)					
Rise Time t_r (ms)	Not given				
Overshoot (%)	Not given				

(25 pts) Procedure/Test Plan

Describe how will you measure, collect and analyze data. Describe the test equipment you will use. Draw a schematic showing how your test equipment is connected to your circuit.