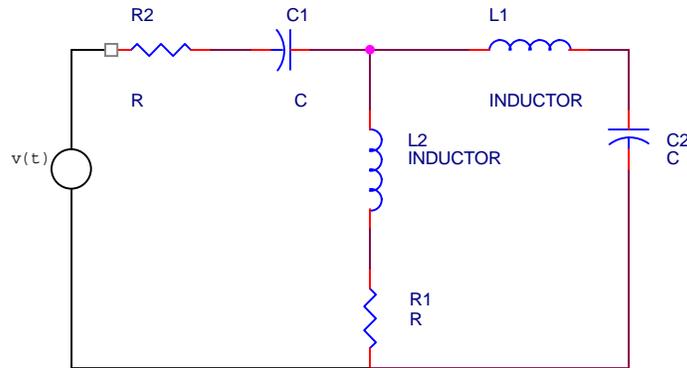ECEN 3723 MATLAB project

This project accounts for 10% of your final project. The purpose of the project is to get you familiarize with computer aided system analysis using MATLAB. Include every step to show your work.

The system under consideration is an electric circuit shown in the following figure.

R2   C1   L1
R   C   INDUCTOR
                       L2
v(t)   INDUCTOR   C2
                                       C
                       R1
                       R

Modeling

(1) Get a set of simultaneous integrodifferential equations representing the network

(2) Get the transfer function between v(t) and the voltage across C2

MATLAB problems: the following problems must be solved using MATLAB

(3) Using the transfer function from (2), create a transfer function object using the following parameters. R1=100k, R1=200k, C1=1 micro-F, C2=0.1 micro-F, L1=L2=0.1 micro-H.

(4) Using the object, find poles.

(5) Based on the pole, guess the response of the system. Explain the reason of your guess (Do not use MATLAB for this problem).

(6) Get impulse, step, sine responses. Plot all three responses.

(7) Get response of the system with the following input:
```
    v(t)    = 0,              (0 <= t < 1),
            = 0.5*(t-1),      (1 <= t < 3),
            = 1,              (3 <= t < 5),
            = 0,              (5 <= t).
```

(8) Get discrete transfer function with sampling period (T=0.01).

(9) Get discrete impulse, step, and sine responses. Plot them.