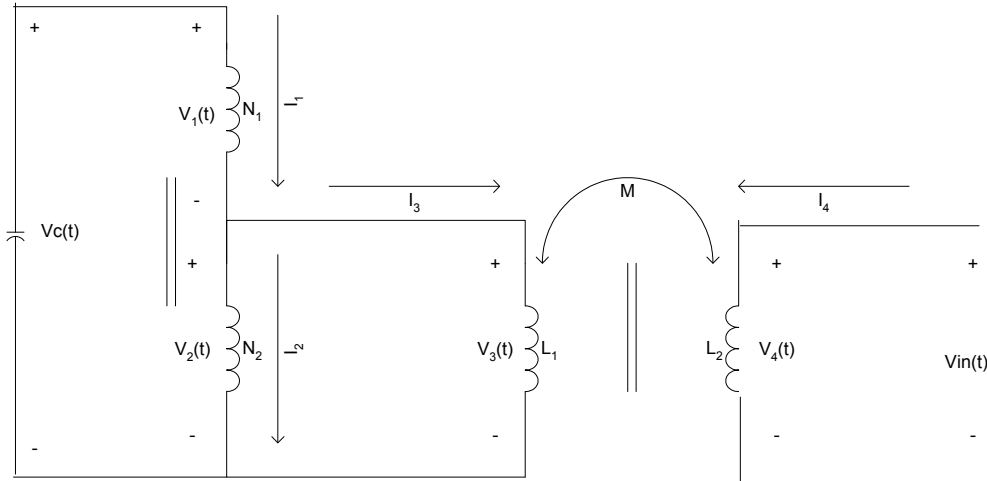


ECE 232 Homework 3

Due date for the homework: 26-05-2014

Q-1- For the circuit below find the transfer function **in Laplace Domain**, $H(s) = \frac{Vc(s)}{Vin(s)}$



Hint: The mathematical relations for the transformer and the coupled inductors can be formulated **in Time Domain** as follows:

$$V_1 = \frac{N_1}{N_2} V_2, \quad I_1 = -\frac{N_2}{N_1} I_2, \quad V_3 = L_1 \frac{dI_3}{dt} + M \frac{dI_4}{dt}, \quad V_4 = M \frac{dI_3}{dt} + L_2 \frac{dI_4}{dt}$$

Q-2- For a circuit the conductance port equation is given by the formula

$$\begin{bmatrix} I_1 \\ I_2 \end{bmatrix} = \begin{bmatrix} g_{11} & g_{12} \\ g_{21} & g_{22} \end{bmatrix} \begin{bmatrix} V_1 \\ V_2 \end{bmatrix}$$

Using this port equation find the ABCD parameters in terms of conductance port equation parameters where ABCD parameters are given by the equation below:

$$\begin{bmatrix} V_1 \\ I_1 \end{bmatrix} = \begin{bmatrix} A & B \\ C & D \end{bmatrix} \begin{bmatrix} V_2 \\ -I_2 \end{bmatrix}$$