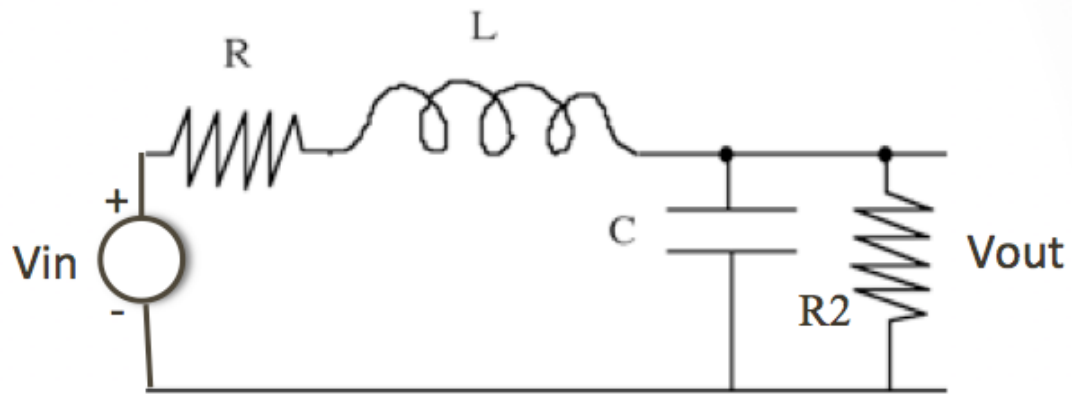1)   (25) Let Vin(t) = 10 cos (10t), R = 10Ω, L = 1H, C = 10mF, and R2 = 10Ω.

   (a) Find the Thevenin equivalent circuit (Thevenin voltage and impedence) for the circuit output vout(t).

   (b) Determine the impedence Z_L at output vout(t) that will result in maximal average power delivered to Z_L .   Determine this maximal average power delivered to Z_L .

2) (a) For the circuit below compute by hand (do not use matlab) the transfer function $H(s) = Vo(s)/Vi(s)$.

(b) Consider a step input use physical arguments to find the initial and final values of Vo.
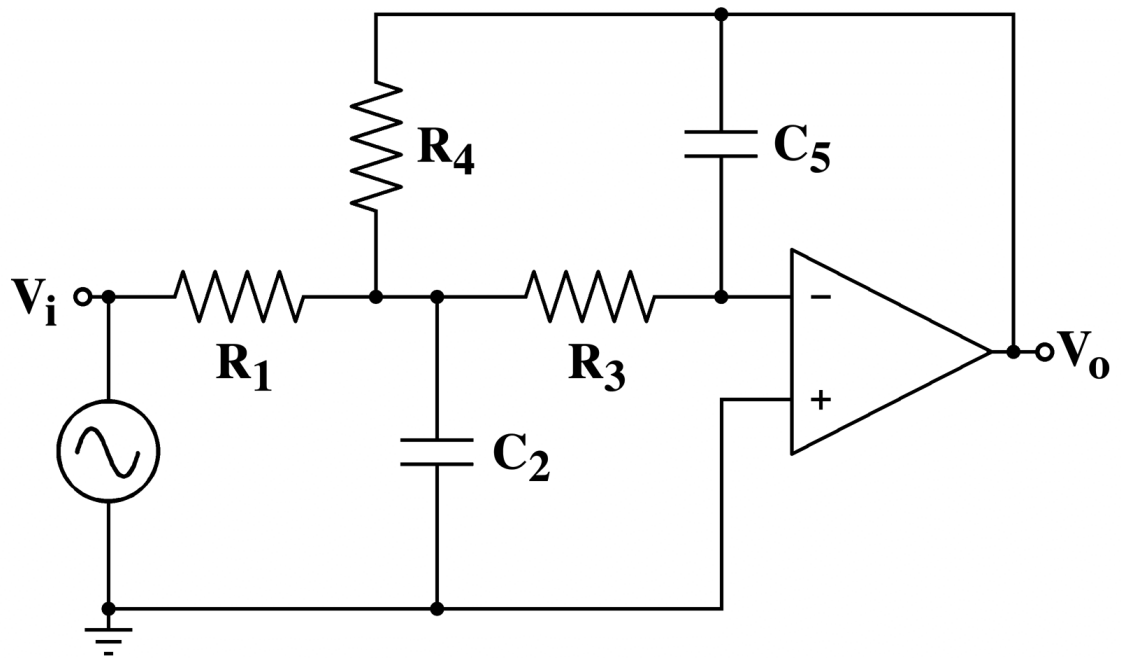
3) (25) Use matlab to determine the transfer function $H(s)$ = OUT(s)/IN(s). Use matlab to find the step response for this transfer function.

out2(t)

a(t)

R4 Ω C F

C F

in(t)

R3 Ω

R2 Ω

R Ω

R5 Ω

out(t)
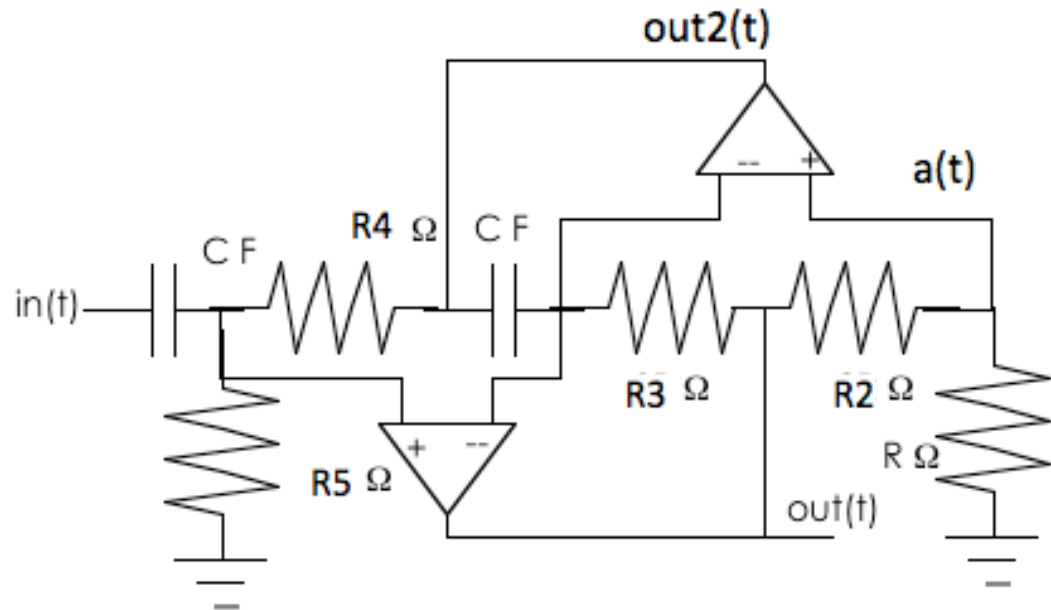
4) (25) Consider the transfer function $H(s) = 1/(s^2 + 5s + 4)$.
   (a) Find the impulse response $h(t)$.
   (b) Find the step response $s(t)$.
   (c) If the input to the circuit is $x(t) = 10\cos(5t)$ and the transfer function is given as above find the output $y(t)$.