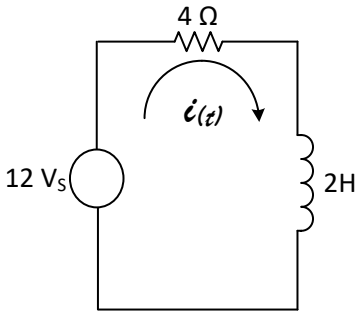
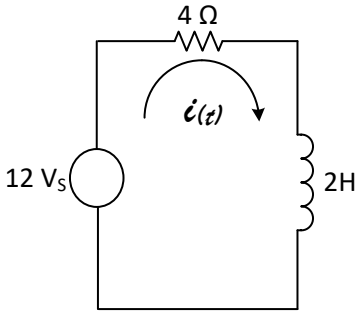
1. A 12 V battery is connected at $t = 0$.

   R = 4Ω
   L = 2H
   Find $i(t)$.



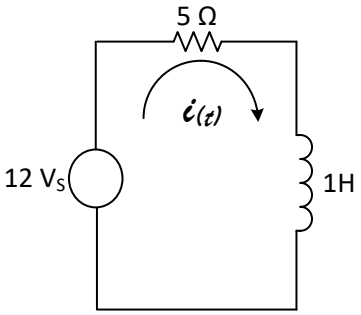
2. Same circuit but **initial current = 2 A**.

   R = 4Ω
   L = 2H
   Find $i(t)$.



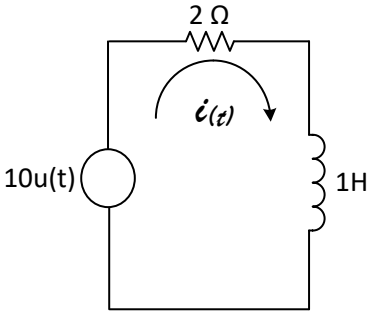
3. Battery removed at $t = 0$.

   Initial current $5A$
   R = 5Ω
   L = 1H



4. Voltage source

   $v(t) = 10u(t)$
   R = 2Ω
   L = 1H

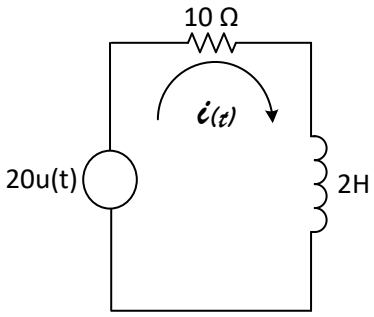


5. Step voltage

$v(t) = 20u(t)$

R = 10Ω

L = 2H

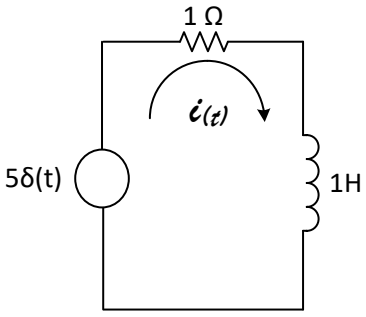


6. Impulse input

$5v(t) = 5\delta(t)$

R = 1Ω

L = 1H

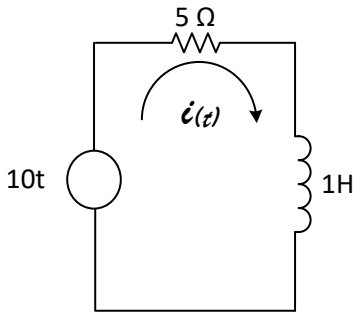


7. Ramp input

$v(t) = 10t$

R = 5Ω

L = 1H

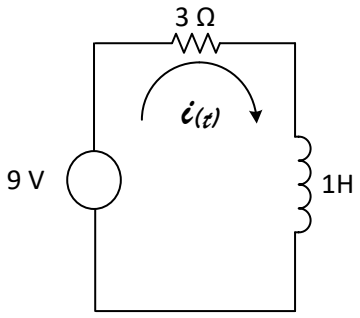


8. Initial current = 3A

V = 9V

R = 3Ω

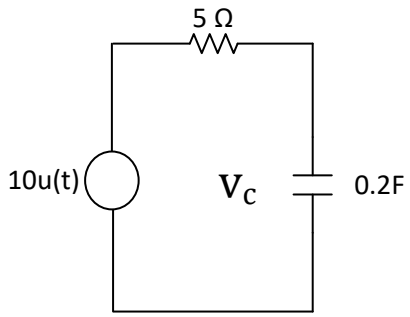
L = 1H



9. 10V step

R = 5Ω

C = 0.2F

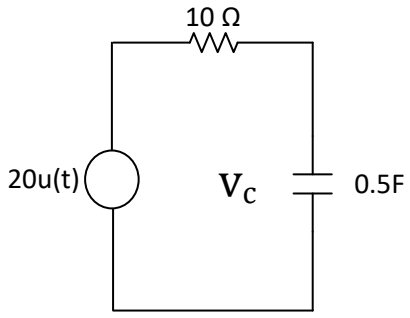


10. Initial capacitor voltage 4V

20V source

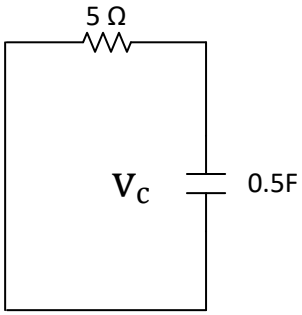
R = 10Ω

C = 0.5F

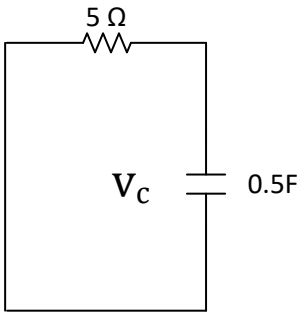


11. Discharge

Initial 10V
R = 5Ω
C = 0.5F



12. Input
$v(t) = 15u(t)$
R = 3Ω
C = 1F

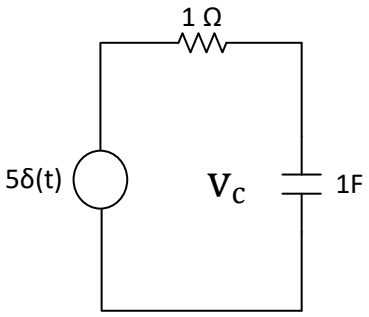


13. Impulse input

$v(t) = 5\delta(t)$

R = 1Ω

C = 1F

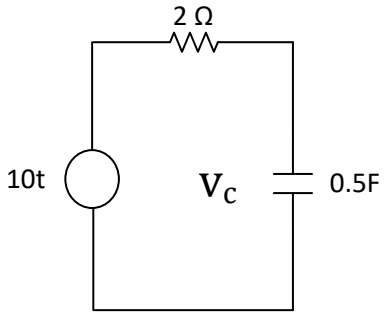


14. Ramp input

$v(t) = 10t$

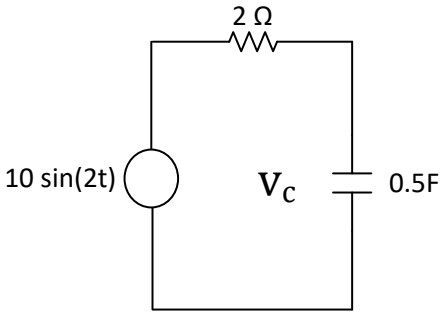
R = 2Ω

C = 0.5F



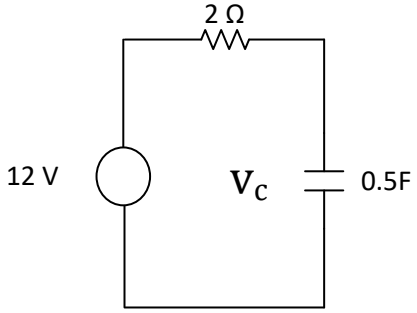
15. Sinusoidal forcing

$v(t) = 10\sin(2t)$



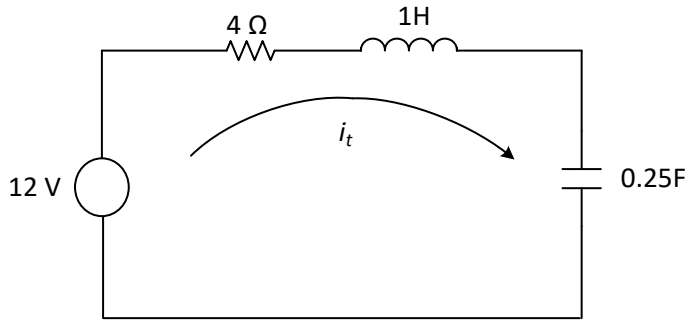
16. Initial voltage across capacitor = +6V

Source = 12V



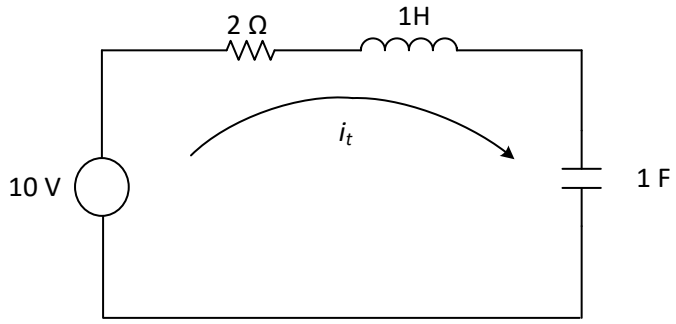
17. Series RLC

R = 4Ω
L = 1H
C = 0.25F
V = 12V



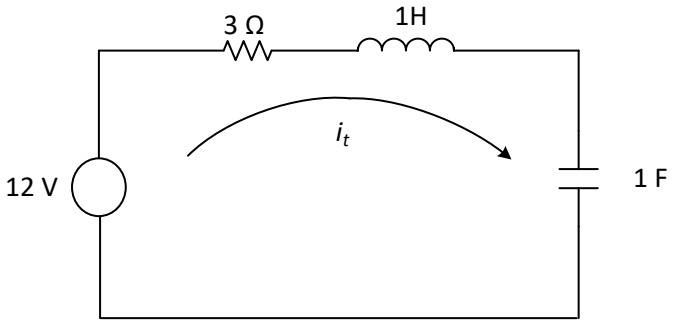
18. Underdamped case

R = 2Ω
L = 1H
C = 1F
V = 10V



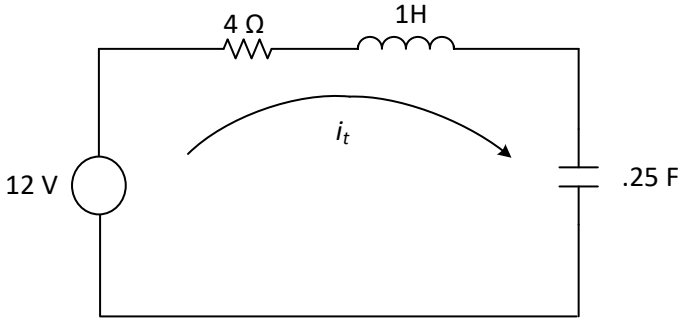
19. Underdamped again

R = 3Ω
L = 1H
C = 1F
V = 12V



20. Critical damping

R = 4Ω
L = 1H
C = 0.25F

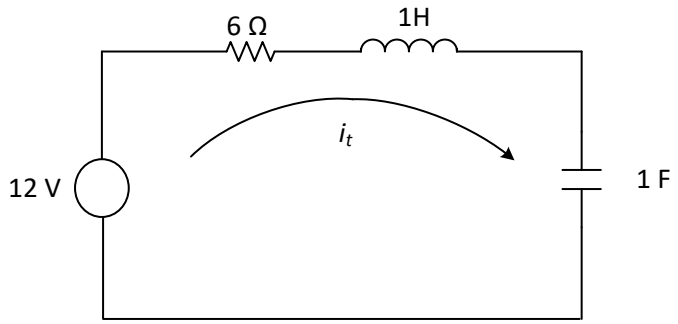


21. Overdamped

R = 6Ω

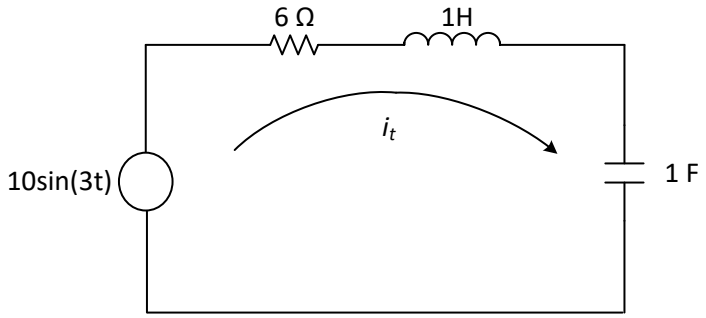
L = 1H

C = 1F

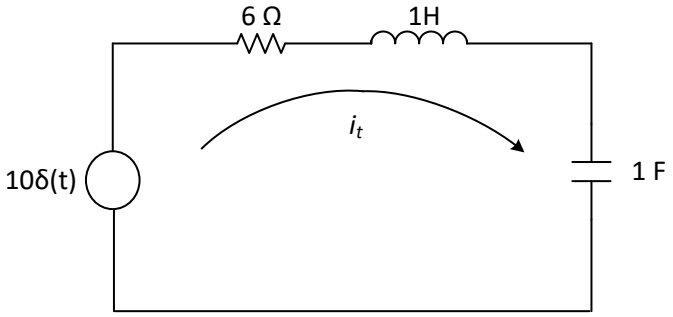


22. Sinusoidal forcing

$v(t) = 10\sin(3t)$



23. Impulse input



24. Current source applied at $t = 0$

$i_s(t) = 6u(t)$A

R = 3 Ω

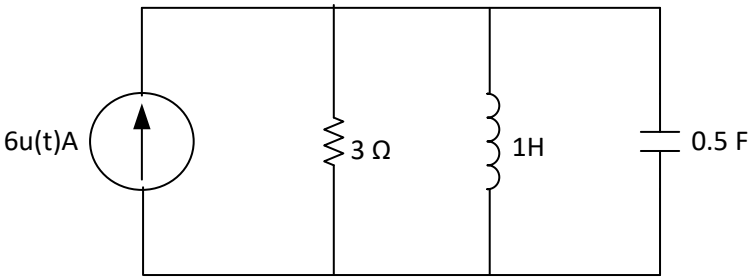
L = 1 H

C = 0.5 F

Initial conditions

$v(0) = 0, i_L(0) = 0$

Find $v(t)$.

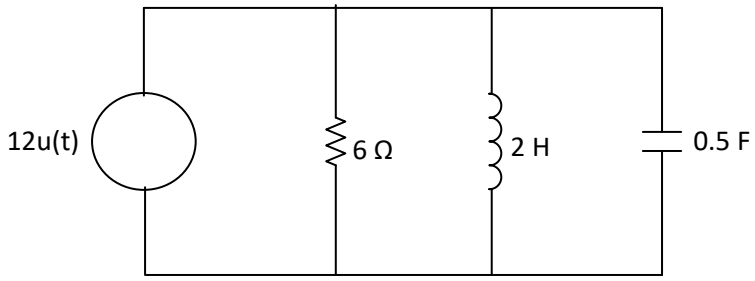


25. Voltage source applied

$v_s(t) = 12u(t)$

R = 6 Ω
L = 2 H
C = 0.5 F

Find inductor current $i_L(t)$.

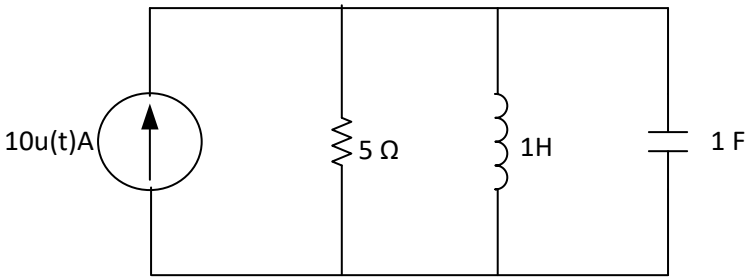


26. Current source

$i_s(t) = 10u(t)$
R = 5 Ω
L = 1 H
C = 1 F

Initial conditions

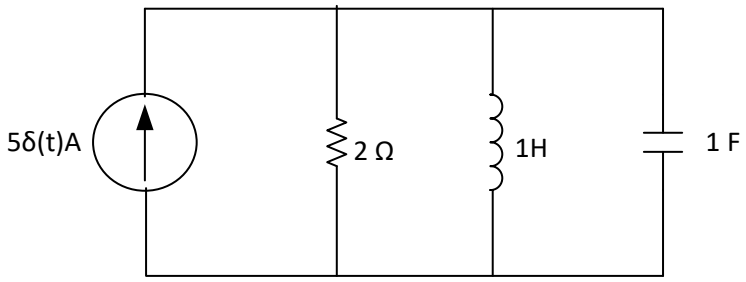
$v(0) = 0$
Find $v(t)$.



27. Impulse current source

$i_s(t) = 5\delta(t)$
R = 2 Ω
L = 1 H
C = 1 F

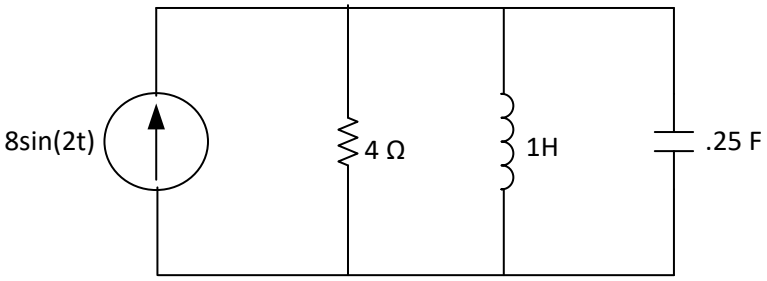
Find $v(t)$



28. Sinusoidal current source

$i_s(t) = 8\sin(2t)$
R = 4 Ω
L = 1 H
C = 0.25 F

Find steady-state voltage.

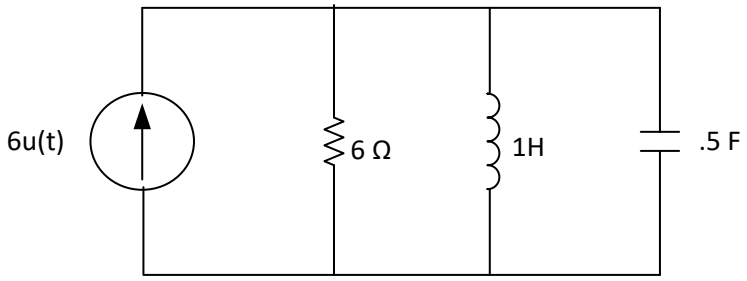


29. Step current source

$i_s(t) = 6u(t)$
R = 6 Ω
L = 1 H
C = 0.5 F

Initial voltage

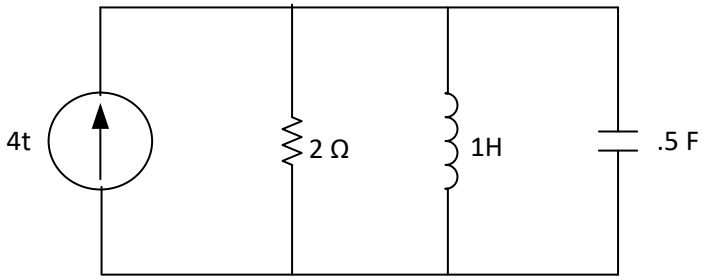
$v(0) = 4V$
Find $v(t)$



30. Ramp current source

$i_s(t) = 4t$
R = 2 Ω
L = 1 H
C = 0.5 F

Find $v(t)$



31: Parallel RLC with initial conditions

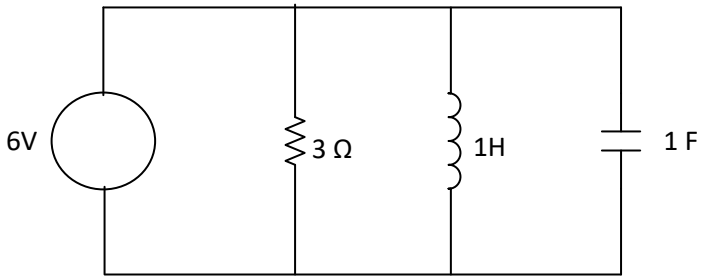
R = 3 Ω
L = 1 H
C = 1 F

Initial

$v(0) = 6V, i_L(0) = 0$

No source (natural response)

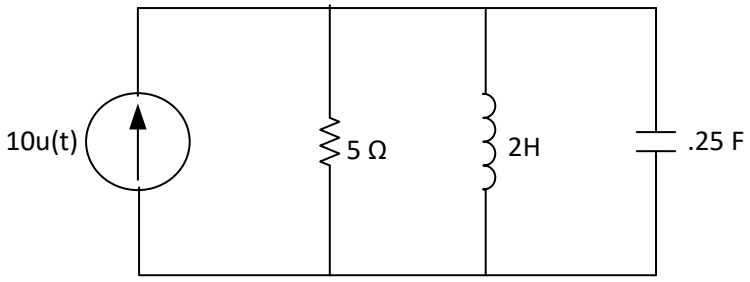
Find $v(t)$



32. Current source

$i_s(t) = 10u(t)$
R = 5 Ω
L = 2 H
C = 0.25 F

Find $v(t)$



33. Sinusoidal current source

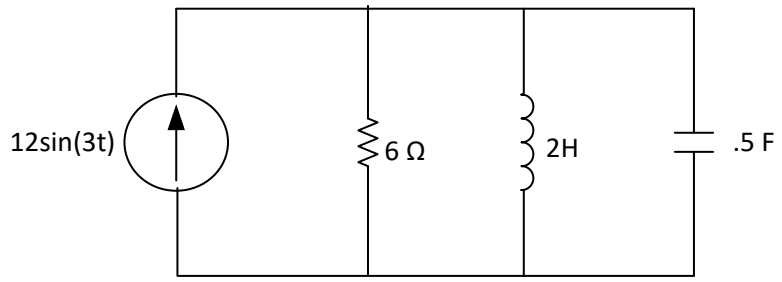
$i_s(t) = 12\sin(3t)$

R = 6 Ω

L = 2 H

C = 0.5 F

Find steady-state voltage.



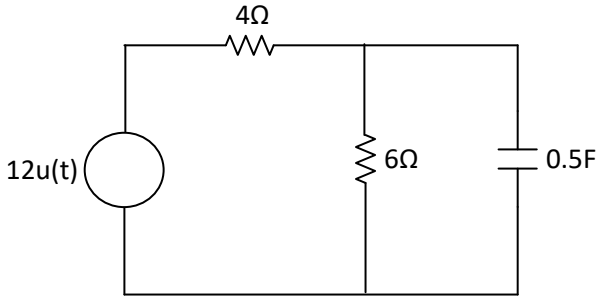
34. Find $v_o(t)$across the capacitor.

R1=4Ω

R2=6Ω

C=0.5F

Initial capacitor voltage = 0



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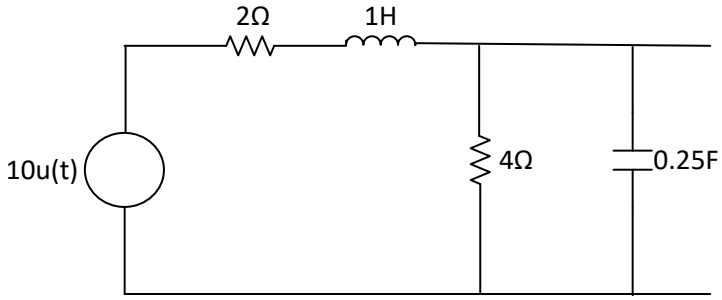
35. Series RL Feeding Parallel RC

Find $v_o(t)$across the capacitor.
Initial conditions = 0.

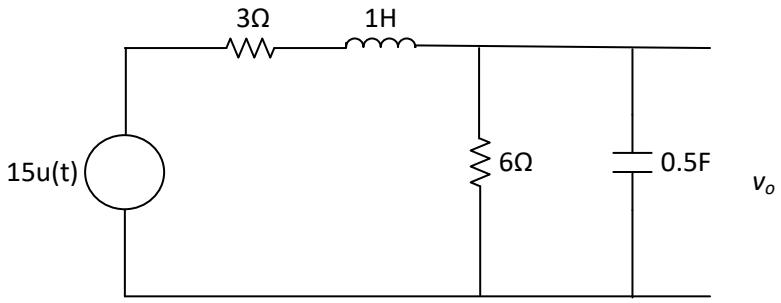


36. Series RLC Feeding Parallel R

Find $v_o(t)$across the parallel resistor.

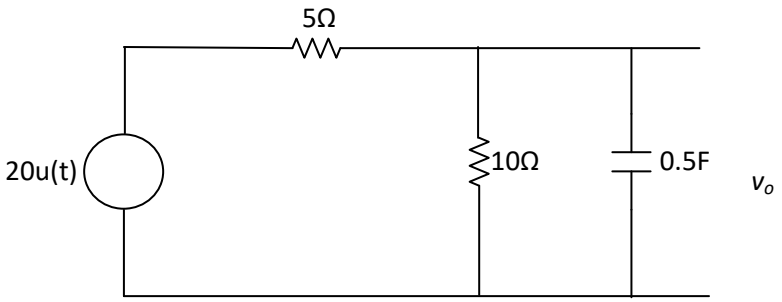
15u(t)
R1=3Ω
L=1H
C=0.5F
R2=6Ω

Initial conditions = 0



37. Parallel RC After Series Divider

Find $v_o(t)$.
20u(t)
R1=5Ω
Initial capacitor voltage = 5 V.

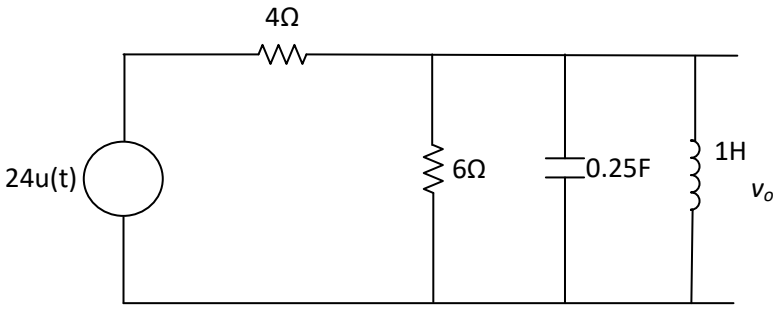


38. Series R Feeding Parallel RLC

Find $v_o(t)$

24u(t)
R1=4Ω
R2=6Ω
L=1H
C=0.25F
vo(t)

Initial conditions = 0

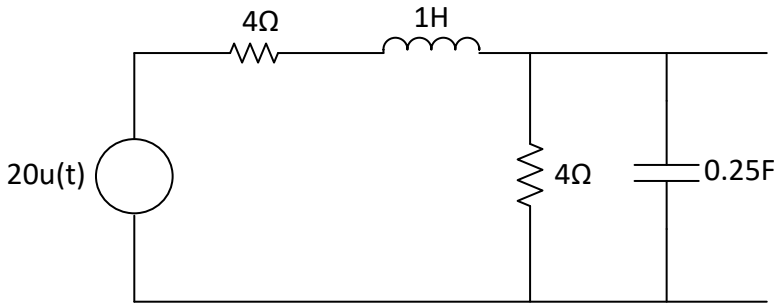


39. Series RL feeding parallel RC (2nd order)

20u(t)
R1=4Ω
L=1H
R2=6Ω
C=0.25F
vo(t)

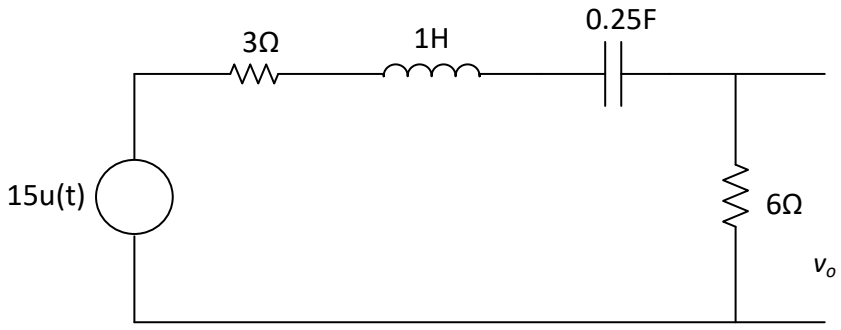
Initial conditions: zero

Find $v_o(t)$.



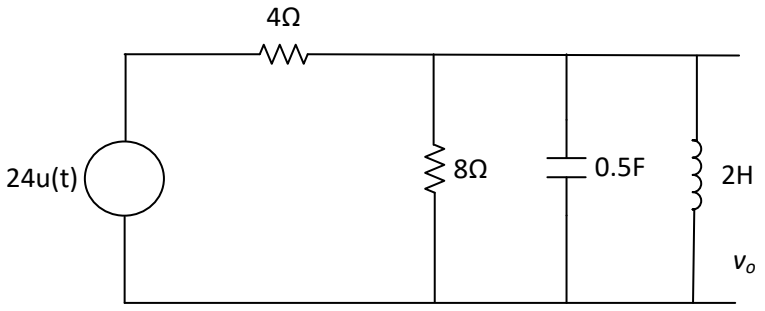
40. Series RLC feeding load resistor

15u(t)
R1=3Ω
L=1H
C=0.5
R2=6Ω
Find $v_o(t)$.



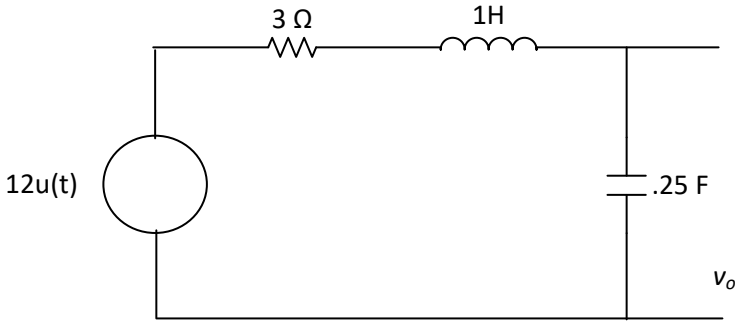
41. Series R feeding parallel RLC

24u(t)
R1=4Ω
R2=8Ω
L=2H
C=0.5F
Find $v_o(t)$.



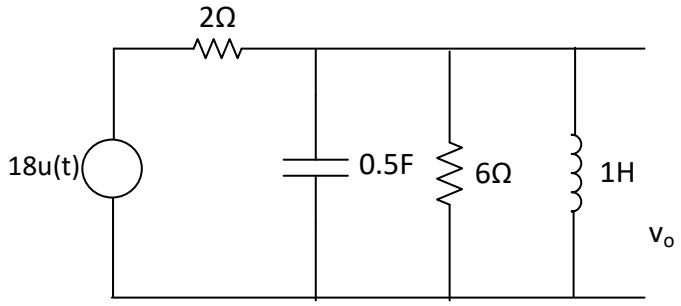
42. Series RL with capacitor output

Find capacitor voltage $v_o(t)$.
12u(t)
R=3Ω
L=1H
C=0.25F



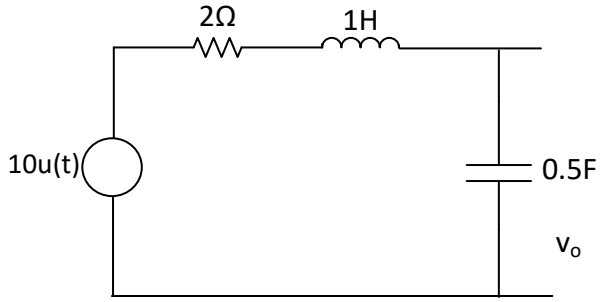
43. Parallel RLC fed through series resistor

Find $v_o(t)$.
18u(t)
R1=2Ω
R2=6Ω
L=1H
C=0.5F



44. Series RLC with capacitor output

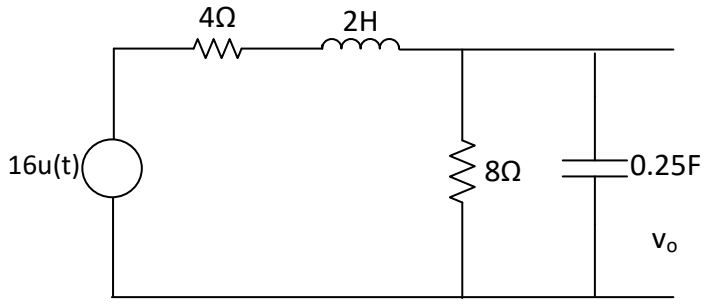
Find $v_o(t)$.
10u(t)
R=2Ω
L=1H
C=0.5F



45. Parallel RC branch after RL

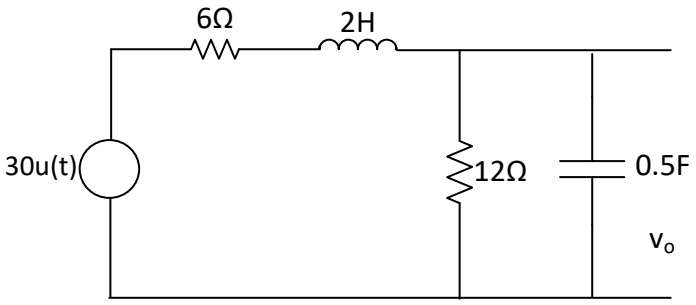
Find $v_o(t)$.

16u(t)
R1=4Ω
L=2H
R2=8Ω
C=0.25F



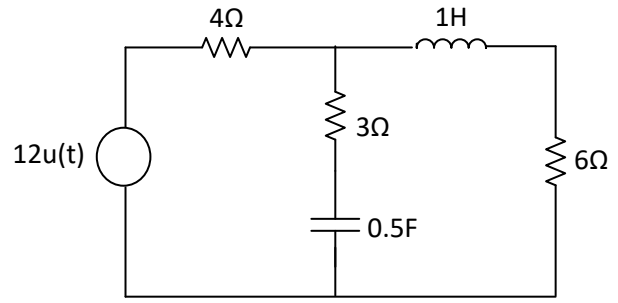
46. Harder mixed RLC network

Find $v_o(t)$.
30u(t)
R1=6Ω
L=2H
R2=12Ω
C=0.5F



47. Two Mesh RL–RC Circuit

Find the mesh currents.

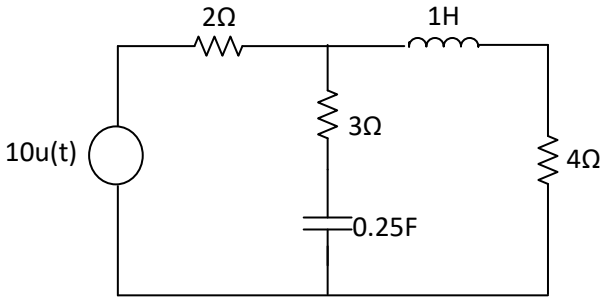


Let Initial conditions = 0.

$i_1(t) =$ left mesh
$i_2(t) =$ right mesh

48. Two Mesh RLC Circuit (Second Order)

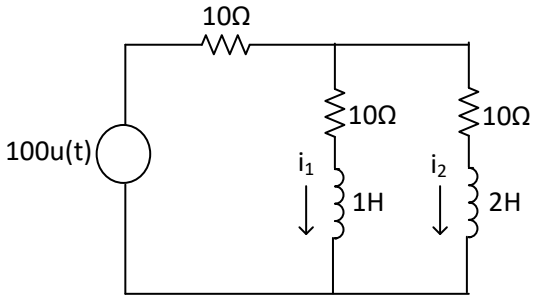
Find $i_1(t)$and $i_2(t)$.



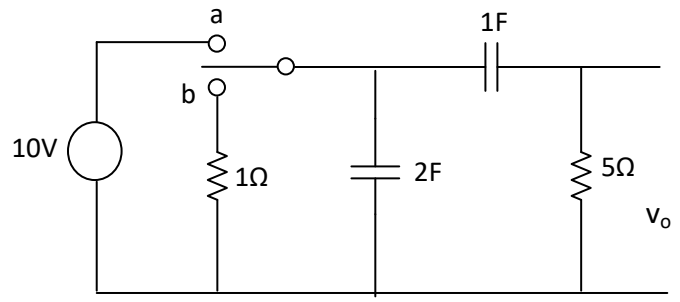
Initial conditions

$i_L(0) = 2A$
$v_C(0) = 4V$

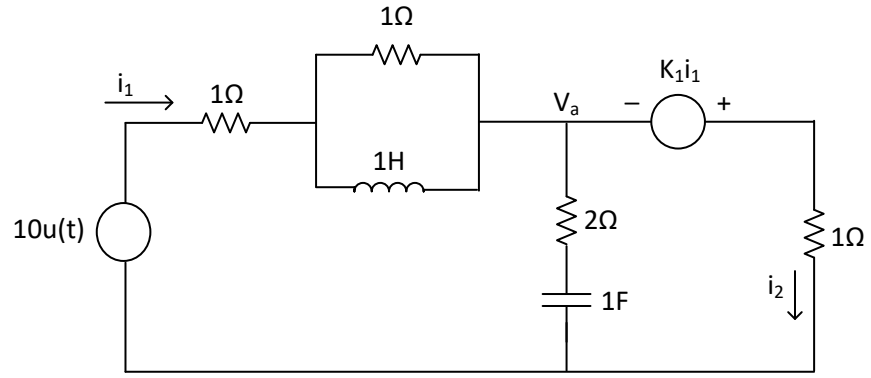
49. Find i1 and i2 in the following:



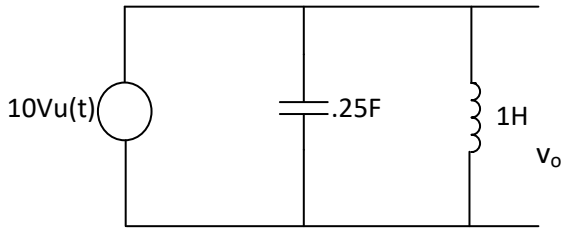
50. The switch changes from a to b at t = 0. Write the equation for v_o.



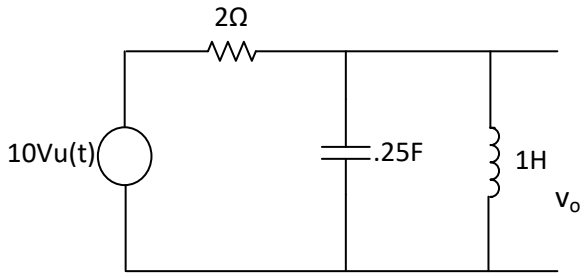
51. For the following, determine V_a with $K_1 = -3$



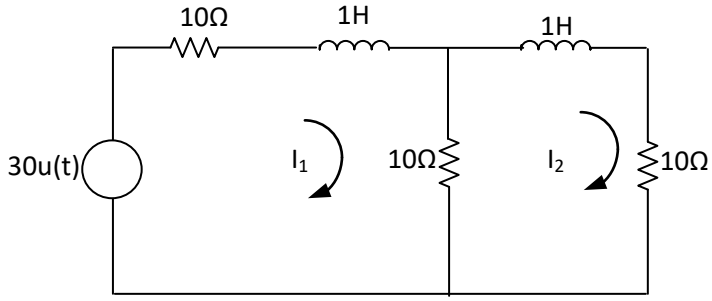
52. Find V_0:



53. Find V_0:



54. Find the current I_2 in the following:



55. Find the voltage across the 5Ω Resistor at right: