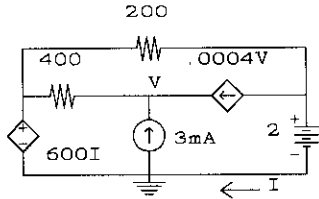


3. Find I . Include .print statements so that the output file shows all branch currents and voltages, and use these to verify Kirchoff's Current Law at all nodes and Kirchoff's Voltage Law around all loops. Which element supplies the most power?

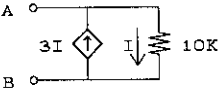


Problem 3

5. Remove the 200-ohm resistor from the circuit for problem 3, and find the Thevenin Equivalent Circuit at the terminals where it was connected. Attach the 200-ohm resistor to the Thevenin Equivalent Circuit and show that the current is the same as with the original circuit.

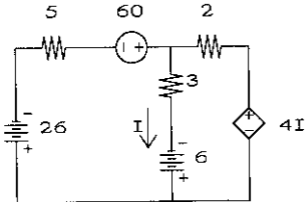
7. Sweep the value of the independent voltage source in the circuit for problem 3 to find the value for which the current through the 400 ohm resistor is zero.

8. Find the Thevenin Equivalent Circuit.



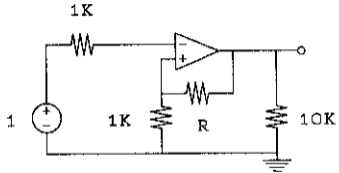
Problem 8

9. Replace the 5-ohm resistor in the circuit for problem 2 with a variable resistor, and use the DC sweep to determine the value which maximizes the power absorbed by that resistor. Challenge problem: repeat, but for the 2-ohm resistor, and explain the peculiar result.



Problem 2

12. Find the largest value of R such that the power in the 10K output resistor is $\leq 20\text{ mW}$.



Problem 12



8.41 The switch in the circuit shown in Fig. P8.41 has been closed for a long time. The switch opens at $t = 0$. Find $v_o(t)$ for $t \geq 0$.

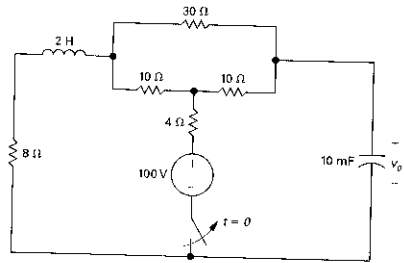
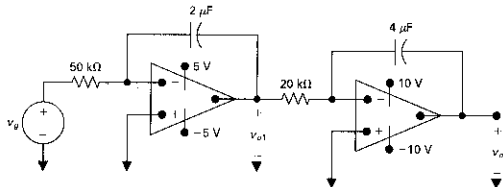
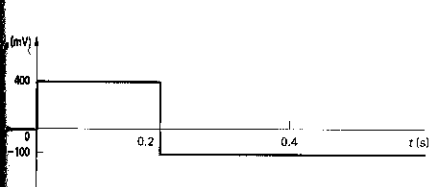


Figure P8.41

8.51 The voltage signal of Fig. P8.51(a) is applied to the cascaded integrating amplifiers shown in Fig. P8.51(b). There is no energy stored in the capacitors at the instant the signal is applied.

- Derive the numerical expressions for $v_o(t)$ and $v_{o1}(t)$ for the time intervals $0 \leq t \leq 0.2$ s and 0.2 s $\leq t \leq t_{\text{sat}}$.
- Compute the value of t_{sat} .



(b)

Figure P8.51

9.23 Find the impedance Z_{ab} in the circuit seen in Fig. P9.23. Express Z_{ab} in both polar and rectangular form.

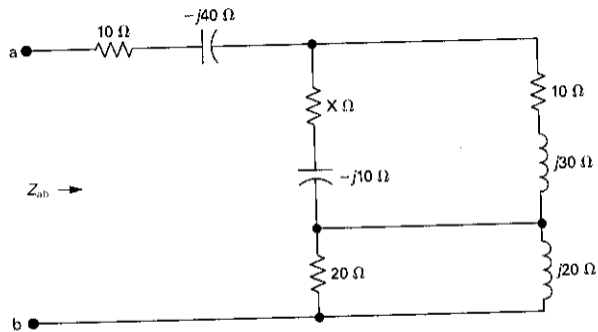


Figure P9.23

9.36 Find the Thévenin impedance seen looking into the terminals a,b of the circuit in Fig. P9.36 if the frequency of operation is 25 krad/s .

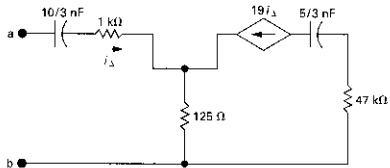
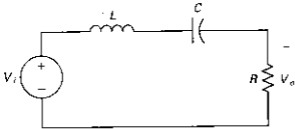


Figure P9.36



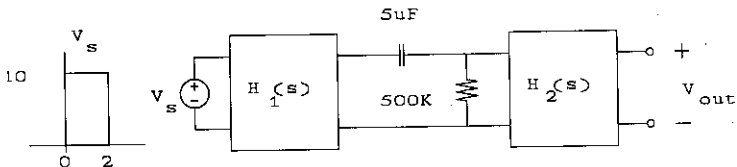
14.19 Use a 20 nF capacitor to design a series RLC bandpass filter, as shown in Fig. 14.19(a). The center frequency of the filter is 20 kHz , and the quality factor is 5.

- Specify the values of R and L .
- What is the lower cutoff frequency in kilohertz?
- What is the upper cutoff frequency in kilohertz?
- What is the bandwidth of the filter in kilohertz?



(a)

3. The pulse shown enters the system shown, with $H_1(s) = 5/(s^2 + s + 5)$ and $H_2(s) = 5/(s^2 + s + 10)$. Display the output of the system, $v_{out}(t)$.



Problem 3