

1. A passive band-pass filter as shown in Fig. 1 with a 1 mH inductor is design to pass the input voltage V_{in} with frequencies in the range of $20 \text{ kHz} \pm 250 \text{ Hz}$. Please determine the values for C and R to meet the required band-pass filter function. [20]
2. For the circuit shown in Fig. 2, please use the Mesh Analysis to determine output current I_{out} . [20]
3. Please determine the output voltage v_o of the op-amp circuit with input voltage $v_{in}=10u(t)$ mV. [20]
4. One current source, $i_s(t) = 4\sin(4t)\text{A}$, and one voltage source, $v_s(t) = 8\cos(4t)\text{V}$, are supplying power to an LCR network as shown in Fig. 4. Please (a) determine the inductor current I_{L1} and capacitor voltage V_{C1} in phasor form and draw them on the same diagram. (b) What is the active and reactive power supplied by the voltage source $v_s(t)$? [20]
5. At $t = 0$, the ideal switches sw1 and sw3 are opened and the ideal switch sw2 changes its connecting point from A to B. Please use Laplace transform to determine the capacitor voltage $v_c(t)$ for $t > 0$. [20]

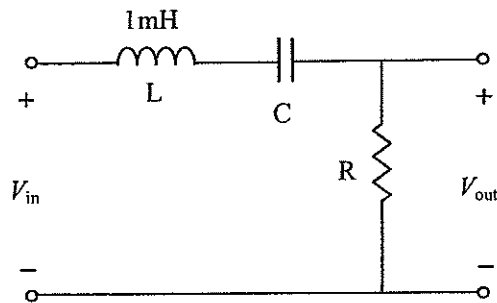


Fig. 1

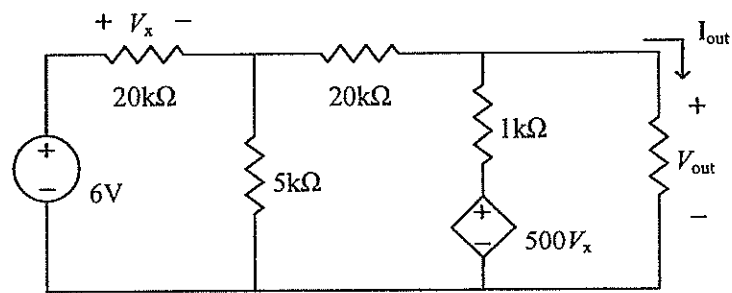


Fig. 2

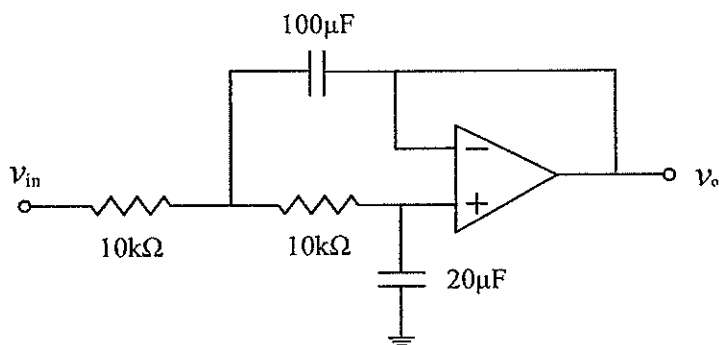


Fig. 3

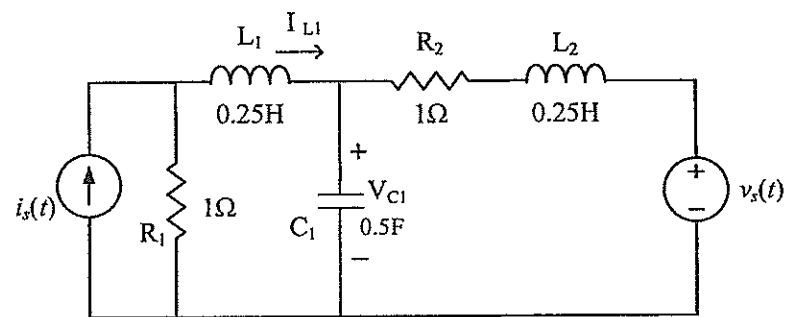


Fig. 4

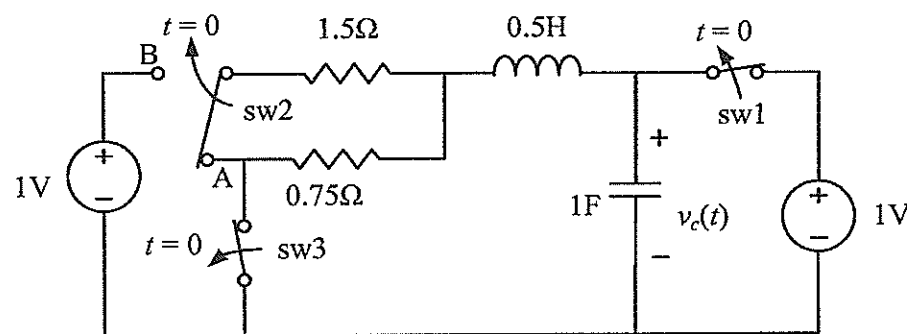


Fig. 5

試題隨卷繳回