



1. The waveform of a voltage $v(t)$ is shown in Fig. 1. Find the effective value of $v(t)$. (15%)

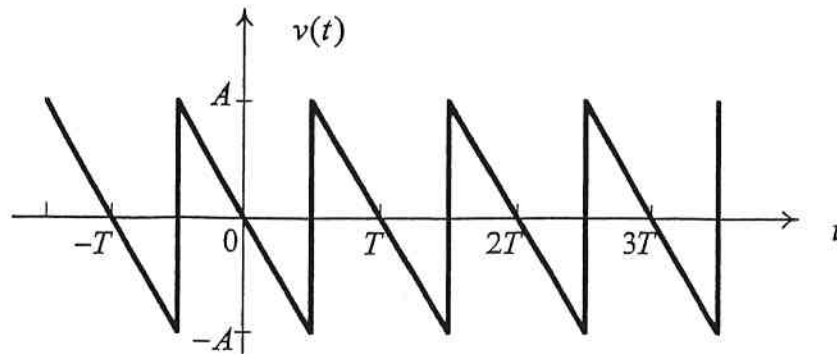


Fig. 1

2. Fig. 2 shows the circuit of an ideal OP AMP, if the input voltages $v_1=1.5$ V and $v_2=3$ V, and the resistances $R_1=3$ k Ω and $R_2=9$ k Ω , find the output voltage v_o . (15%)

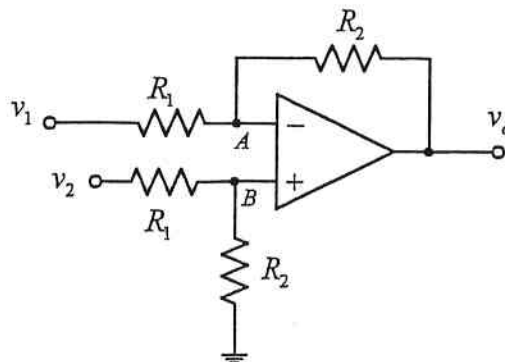


Fig. 2

3. A double-inductor second-order circuit is shown in Fig. 3. The switch closes at $t=0$. If the initial currents of the two inductors are both zero,
- (a) find the final conditions $i_1(\infty)$ and $i_2(\infty)$, (6%)
- (b) find $i_1(t)$ for $t > 0$. (14%)

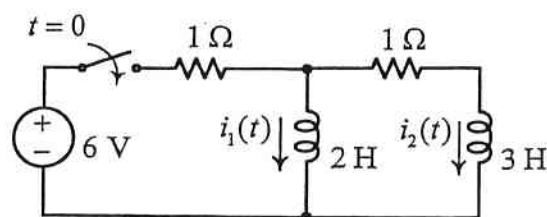


Fig. 3



4. Find Z_L for maximum average power transfer and the maximum average power transferred to the load in the network in Fig. 4. (15%)

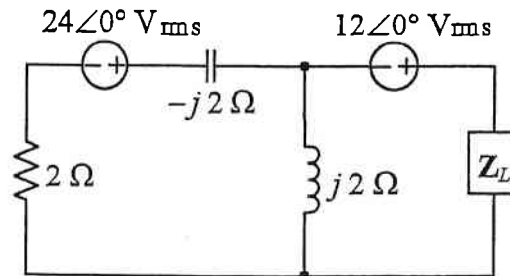


Fig. 4

5. A three-phase load is supplied by a balanced three-phase source through a transmission line with an impedance of $1+j1 \Omega$ per phase in the network in Fig. 5, determine the real and reactive power per phase at the load and the total real power, reactive power, apparent power, and power factor at the source. (20%)

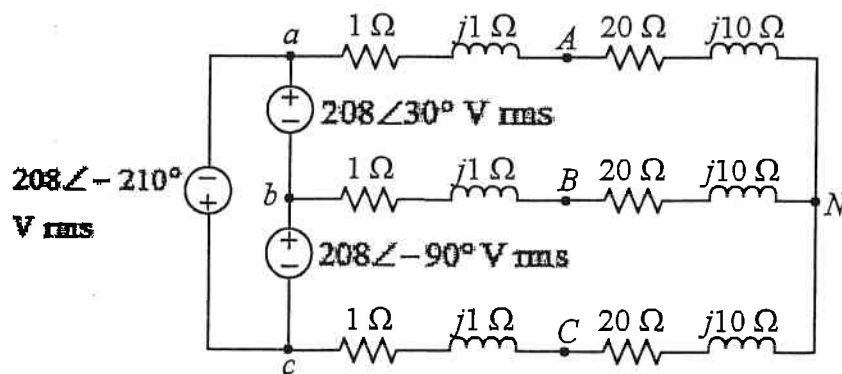


Fig. 5

6. Find the transfer function $V(s)/I(s)$ for the circuit in Fig. 6. Obtain its poles and zeros. (15%)

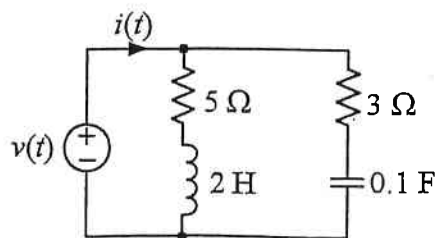


Fig. 6