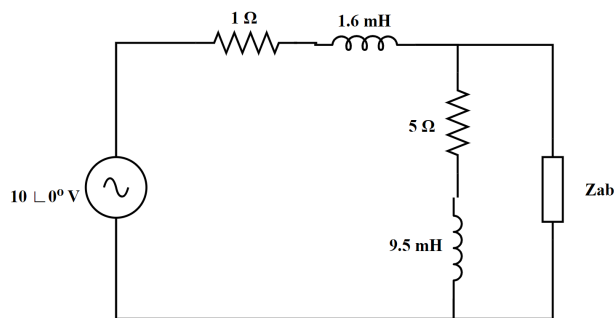


Tutorial 4 EE1100

AC Circuits

Problem 1

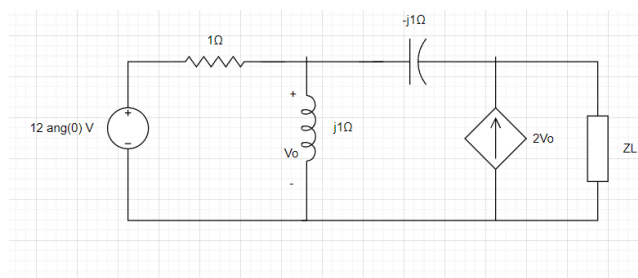
Find the magnitude and phase angle of source current if, (i) Z_{ab} is open circuited; (ii) Z_{ab} : $R_{ab} = 2\ \Omega$, $L_{ab} = 5\text{ mH}$; (iii) Z_{ab} : $R_{ab} = 2\ \Omega$, $C_{ab} = 100\ \mu\text{F}$. Also find the power factor at each case and comment on the result.



Solution: (i) $I = 1.019\ \angle(30.17)\text{ A}$; $\text{pf} = 0.9$ (ii) $I = 2.452\ \angle(32.35)\text{ A}$; $\text{pf} = 0.886$ (iii) $I = 0.9593\ \angle(21.68)\text{ A}$; $\text{pf} = 0.9471$

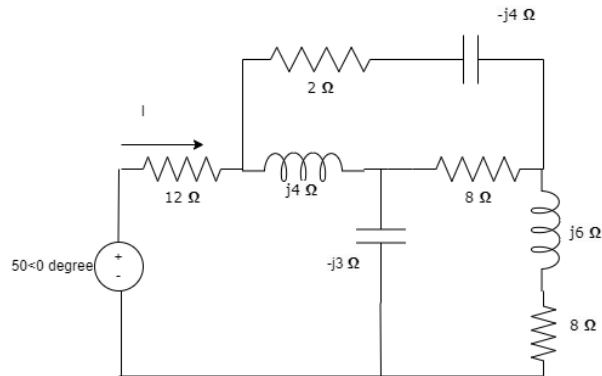
Problem 2

Find the value of Z_L that will absorb the maximum power and the value of maximum power.



Problem 3

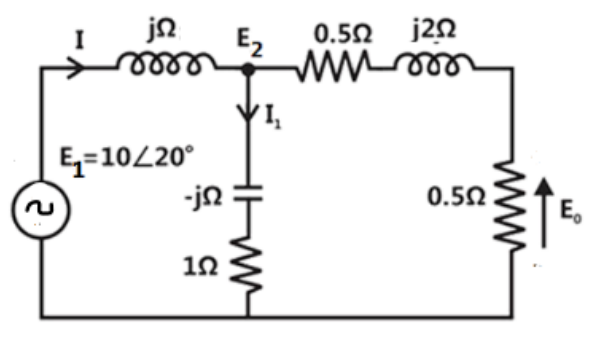
Find current \mathbf{I} in the circuit of Fig: 3



Ans: $3.666 \angle -4.204^\circ \text{ A}$

Problem 4

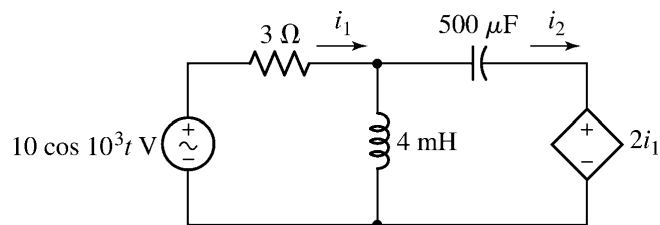
For the circuit shown find the phasors E_2 , E_0 , \mathbf{I} and \mathbf{I}_1 . (Units in volts and ampere only)



Solutions : $E_2 = 8.77 \angle -17.87^\circ$, $E_0 = 1.96 \angle -81.30^\circ$, $\mathbf{I} = 6.2 \angle -9.75^\circ$ and $\mathbf{I}_1 = 6.201 \angle 27.13^\circ$.

Problem 5

Obtain expressions for the time-domain currents i_1 and i_2 in the circuit given:



Answer: $i_1(t) = 1.24 \cos(10^3 t + 29.7^\circ) \text{ A}$, $i_2(t) = 2.77 \cos(10^3 t + 56.3^\circ) \text{ A}$