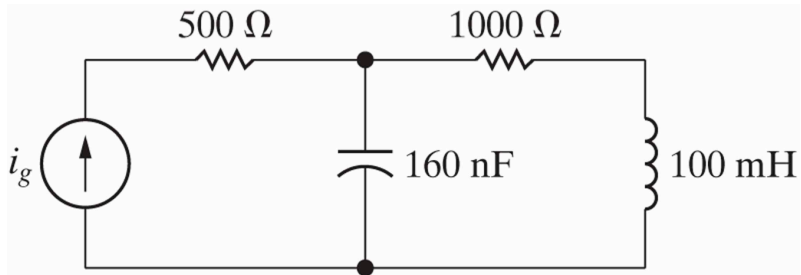


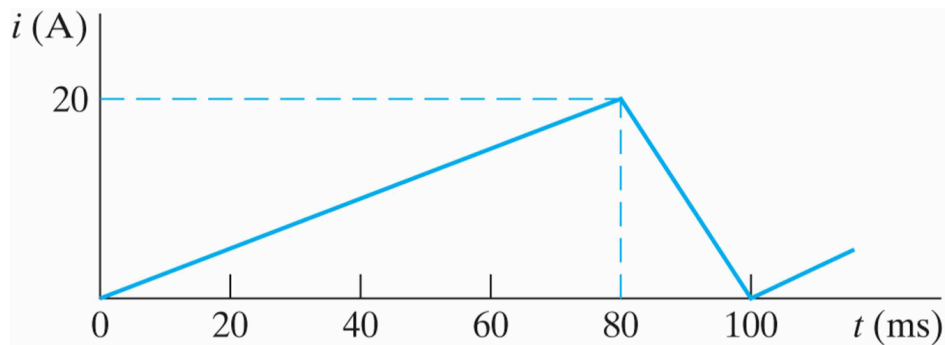
Problem # 1

Find the average power delivered by the ideal current source in the circuit if $i_g = 4 \cos 5000t$ mA.



Problem #2

Find the rms value of the periodic current.

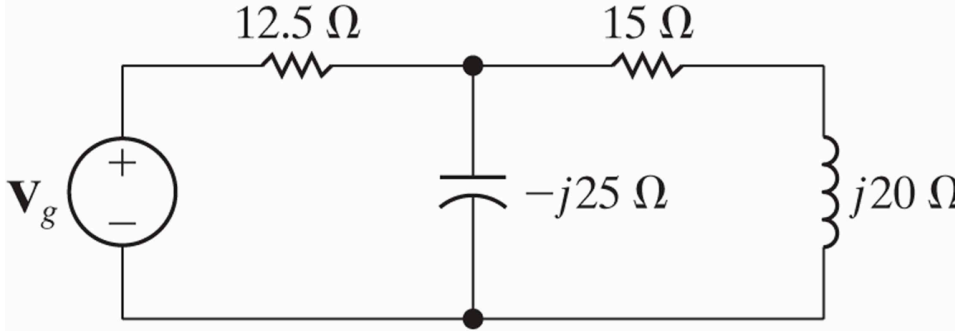


Problem #3

The voltage V_g shown in the frequency-domain circuit is $240 \angle 0^\circ$ V (rms).

- Find the average and reactive power for the voltage source.
- Is the voltage source absorbing or delivering average power?
- Is the voltage source absorbing or delivering magnetizing vars?

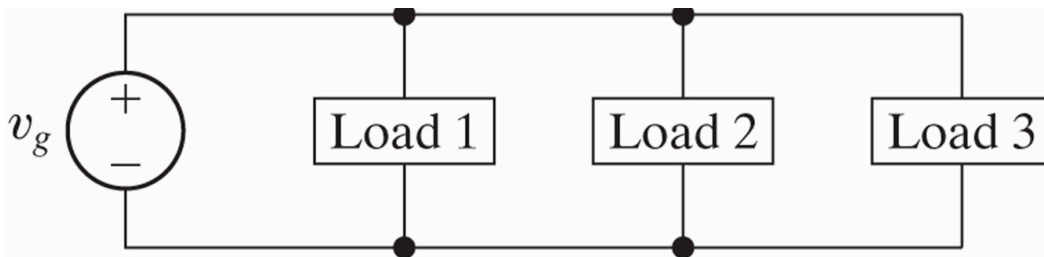
- d) Find the average and reactive powers associated with each impedance branch in the circuit.
- e) Check the balance between delivered and absorbed average power.
- f) Check the balance between delivered and absorbed magnetizing vars.



Problem #4

The three loads in the circuit can be described as follows: Load 1 is a 240Ω resistor in series with an inductive reactance of 70Ω ; load 2 is a capacitive reactance of 120Ω in series with a 160Ω resistor; and load 3 is a 30Ω resistor in series with a capacitive reactance of 40Ω . The frequency of the voltage source is 60 Hz .

- a) Give the power factor and reactive factor of each load.
- b) Give the power factor and reactive factor of the composite load seen by the voltage source.



Problem #5

Prove that if only the magnitude of the load impedance can be varied, most average power is transferred to the load when $|Z_L| = |Z_{Th}|$. (*Hint: In deriving the expression for the average load power, write the load impedance (Z_L) in the form $Z_L = |Z_L| \cos \theta + j|Z_L| \sin \theta$, and note that only $|Z_L|$ is variable.*)