Homework II

P 12.3-3 ⊕ A Y-connected source and load are shown in Figure P 12.3-3. (a) Determine the rms value of the current $i_a(t)$. (b) Determine the average power delivered to the load.

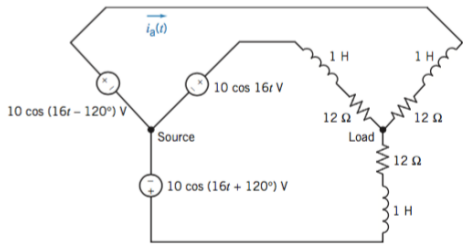


Figure P 12.3-3

P 12.3-1 ⊕ Consider a three-wire Y-to-Y circuit. The voltages of the Y-connected source are $\mathbf{V}_a = (208/\sqrt{3})\ \angle 0°$ V rms, $\mathbf{V}_b = (208/\sqrt{3})\ \angle -120°$ V rms, and $\mathbf{V}_c = (208/\sqrt{3})\ \angle 120°$ V rms. The Y-connected load is balanced. The impedance of each phase is $\mathbf{Z} = 12\ \angle 30°\ \Omega$.

(a) Find the phase voltages.
(b) Find the line currents and phase currents.
(c) Show the line currents and phase currents on a phasor diagram.
(d) Determine the power dissipated in the load.

P 12.5-1 ⊕ Consider a three-wire Y-to-Δ circuit. The voltages of the Y-connected source are $\mathbf{V}_a = (208/\sqrt{3})\ \angle -30°$ V rms, $\mathbf{V}_b = (208/\sqrt{3})\ \angle -150°$ V rms, and $\mathbf{V}_c = (208/\sqrt{3})\ \angle 90°$ V rms. The Δ-connected load is balanced. The impedance of each phase is $\mathbf{Z} = 12\ \angle 30°\ \Omega$. Determine the line currents and calculate the power dissipated in the load.

P 13.3-3 ⊕ The input to the circuit shown in Figure P 13.3-3 is the source voltage $v_{in}(t)$, and the response is the voltage across R_3, $v_{out}(t)$. The component values are $R_1 = 5\,\text{k}\Omega$, $R_2 = 10\,\text{k}\Omega$, $C_1 = 0.1\ \mu\text{F}$, and $C_2 = 0.1\ \mu\text{F}$. Sketch the asymptotic magnitude Bode plot for the network function.

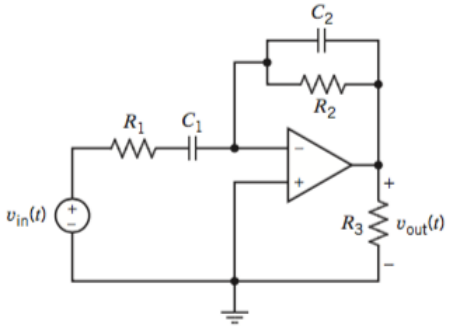
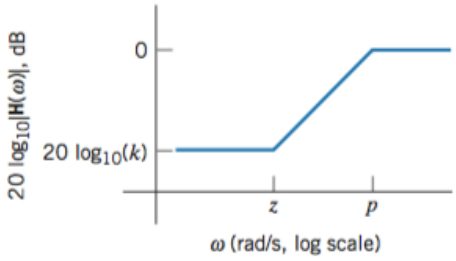
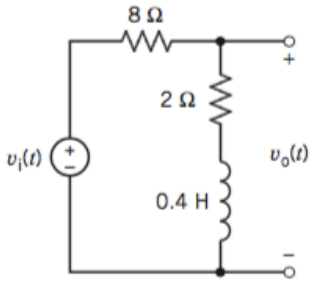


Figure P 13.3-3

P 13.3-7 ⊕ The input to the circuit shown in Figure P 13.3-7*b* is the voltage of the voltage source $v_i(t)$. The output is the voltage $v_o(t)$. The network function of this circuit is $\mathbf{H}(\omega) = \mathbf{V}_o(\omega)/\mathbf{V}_i(\omega)$. The magnitude Bode plot is shown in Figure P 13.3-7*a*. Determine values of the corner frequencies z and p. Determine the value of the low-frequency gain, k.



(a)



(b)

Figure P 13.3-7