

Lesson 24

Problem 24.1

Frequency response plots for a physical system were determined experimentally and are shown below. Using the figure, obtain the steady state response when the input is:

- (a) $u(t) = 8\sin(10t)$
- (b) $u(t) = 8\sin(10t + \pi) + 5\cos(0.6t)$

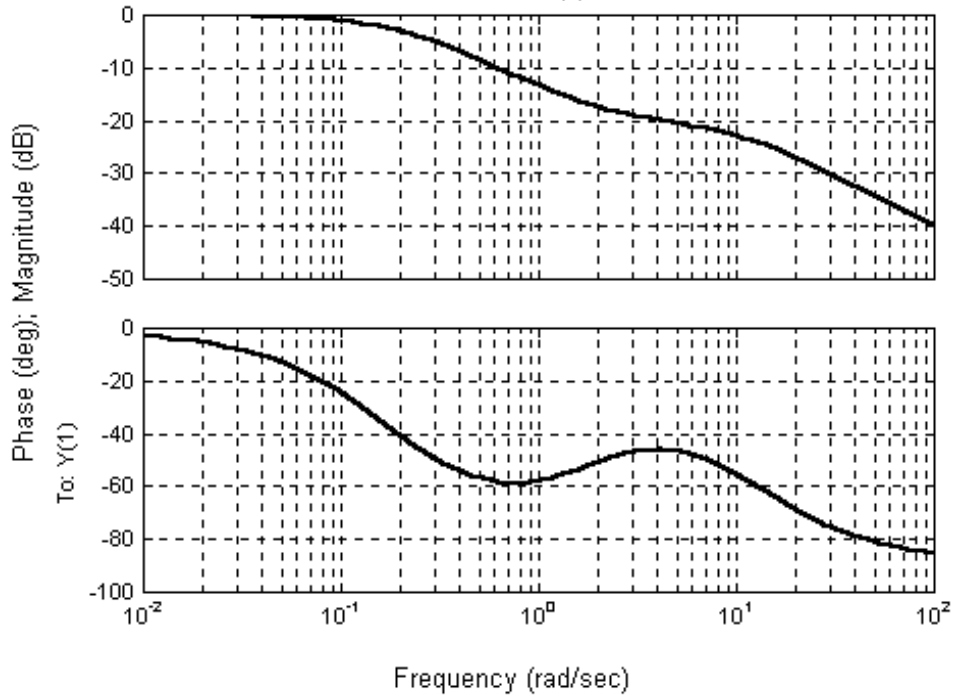


Fig 26.1: Frequency response plot of an unknown system.

Problem 24.2

For the following circuit, when input $V_{in}(t) = A\cos(5000t)$, we measure steady-state output

$$V_{out}(t) = 1.3416\cos(5000t + \theta_1),$$

and when

$$V_{in}(t) = A\cos(8000t)$$

we measure steady-state output

$$V_{out}(t) = 1.1714\cos(8000t + \theta_2).$$

If $R = 100\Omega$, find A , θ_1 , θ_2 , and L .

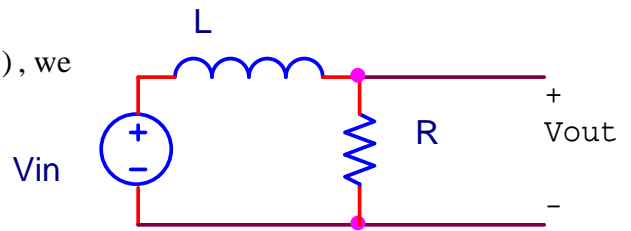


Fig 26.2: Passive RL circuit.

Problem 24.3

Sketch the straight line asymptotic frequency response plots for the following transfer function.

$$TF(s) = \frac{s+2}{s^2+44s+160}$$

