

Massachusetts Institute of Technology
Department of Electrical Engineering and Computer Science

6.002 - Electronic Circuits
Fall 2000

Homework #10
Handout F00-52

Issued 11/9/2000 - Due 11/22/2000

Readings: Chapter 13, Chapter 14, Sections 15.1-15.3

Exercise 10-1: Chapter 14, Exercise 14.7, parts b, c, and d only; (page 825).

Note the terminology “natural frequency” in part (d). The definition of natural frequency is the value of s_0 , in a waveform of the form $e^{s_0 t}$, that satisfies the homogenous differential equation. For example, if

$$\frac{dV}{dt} + \frac{V}{\tau} = 0$$

then $e^{s_0 t}$ is a homogenous solution when the natural frequency $s_0 = -\frac{1}{\tau}$.

Exercise 10-2: Chapter 15, Exercise 15.2 (page 873).

Problem 10-1:

Assume that the network in Figure 1 is in sinusoidal steady state. Determine the response $v_{OUT}(t)$ to the input $v_{IN}(t) \equiv V_{SI} \cos(\omega_S t)$. Note that $v_{OUT}(t)$ will take the form $v_{OUT}(t) = V_{SO}(\omega_S) \cos(\omega_S t + \phi_S(\omega_S))$.

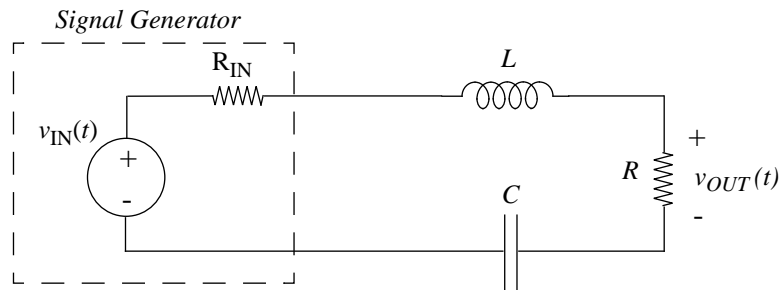


Figure 1

The results of this problem will be used in the Pre-Lab of Lab 3.

Problem 10-2: Chapter 14, Problem 14.16, parts a,b, and c only; (page 834).

Problem 10-3: Chapter 15, Problem 15.1 (page 881).