Homework Assignment #11 – due in class on Wednesday, Nov. 16, 2011

Note on phase shift:

Remember that the standard way of expressing phase is to use values with magnitudes less than 180°. That is, phase shift is normally expressed in the range −180 to +180. For example, a waveform that lags (follows) another by −210° would usually be said to *lead* the other by +150° (−210° = +150°).

Textbook Problems: 7.19 and 7.20.

Simultaneous, linear equations with complex numbers: Use your calculator to solve for x and y and express the solution in polar form:

$$(j2)x + (1 - j)y = 5\angle -30°$$
$$(1 + j)x - (3 + j)y = 1$$

Additional Problems:

1. Find a mathematical expression for the following sinusoidal current in cosine form. Assume that the sinusoidal waveform extends beyond the curve shown in the positive and negative t directions. Pay attention to the units on both axes.
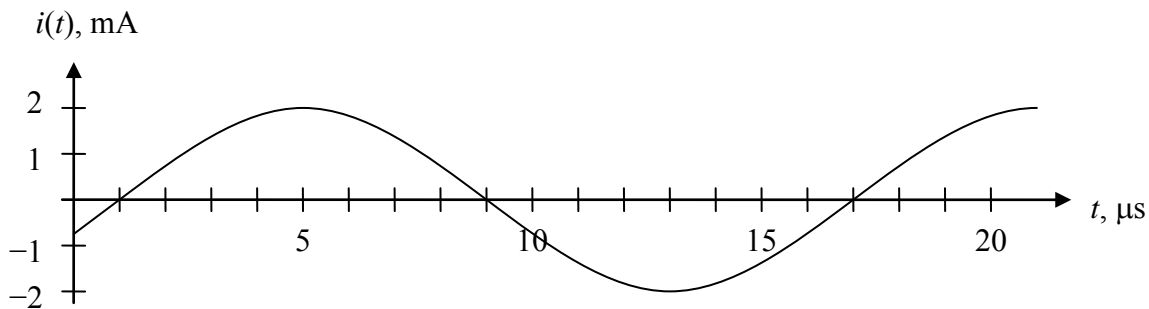
2. What is the *period* of the sinusoidal waveform in Prob. 1?
3. If the current in Prob. 1 is flowing through a 10-µH inductor, what is the maximum voltage drop (any polarity) across the inductor at any time?
4. Redraw the current waveform in Prob. 1 for the case when it has experienced a phase shift of +40°.
5. Calculate the phase shift (in degrees) between waveforms i_1 and i_2 in the figure below. Be sure to indicate which waveform leads or lags (follows) the other.