EE 40: Introduction to Microelectronic Circuits
Spring 2008: HW 5
(due 3/7, 5 pm)

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Referenced problems from Hambley, 4th edition.

1. P4.27
2. P4.62 *(NOTE: The is a typo in part (b) of problem P4.61, which should say* $v'(0+) = 10^9 \frac{V}{s}$*.)*
3. P4.66
4. P5.16
5. Suppose that $v_1(t) = 80\cos(\omega t)$ and $v_2(t) = 60\sin(\omega t)$. Use phasors to reduce the sum $v_s(t) = v_1(t) + v_2(t)$ to a single term of the form $V_m \cos(\omega t + \theta)$. Draw a phasor diagram, showing $\mathbf{V_1}$, $\mathbf{V_2}$, and $\mathbf{V_s}$. State the phase relationships between each pair of these phasors.
6. Find an expression for $v(t)$ of the form $V_m \cos(\omega t + \theta)$ when $v(t) = v_1(t) + v_2(t) + v_3(t) + v_4(t)$ with

$$\begin{aligned} v_1(t) &= 20\sin(\omega t) \\ v_2(t) &= 20\cos(\omega t + \frac{\pi}{6}) \\ v_3(t) &= 20\sin(\omega t + \frac{\pi}{3}) \\ v_4(t) &= -10\cos(\omega t) \end{aligned}$$

   Use phasors.

7. P5.33
8. Find the complex impedance in polar form of the network shown in Figure 1 for $\omega = 1000\frac{1}{s}$, $\omega = 2000\frac{1}{s}$, and $\omega = 4000\frac{1}{s}$.

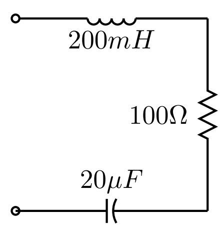

Figure 1: Circuit 1

9. P5.47
10. P5.50