

EEC 130A: Homework 9

Due: 3:30 pm, Mar. 19th, 2013

1. (FAE P5.40) The rectangular loop shown in Fig. 1 is coplanar with the long, straight wire carrying the current $I = 20 \text{ A}$. Determine the magnetic flux through the loop.

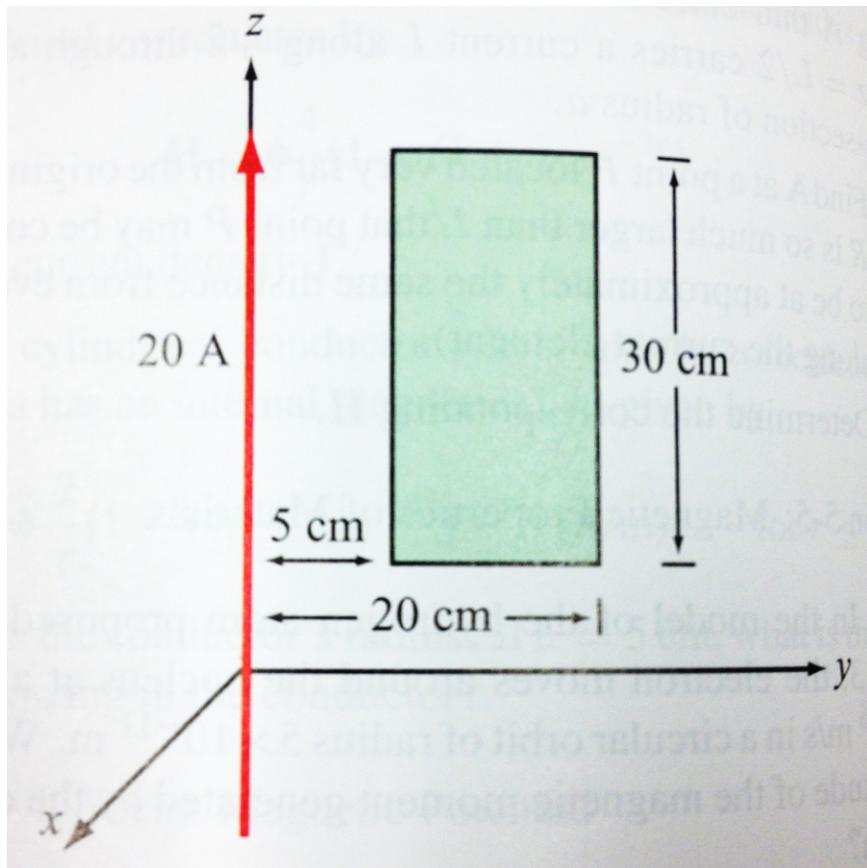


Figure 1: Loop and wire arrangement for Problem 1.

2. (FAE P6.6) The square loop shown in Fig. 2 is coplanar with a long, straight wire carrying a current

$$I(t) = 5 \cos(2\pi \times 10^4 t)$$

- Determine the emf induced across a small gap created in the loop.
- Determine the direction and magnitude of the current that would flow through a 4Ω resistor connected across the gap. The loop has an internal resistance of 1Ω .

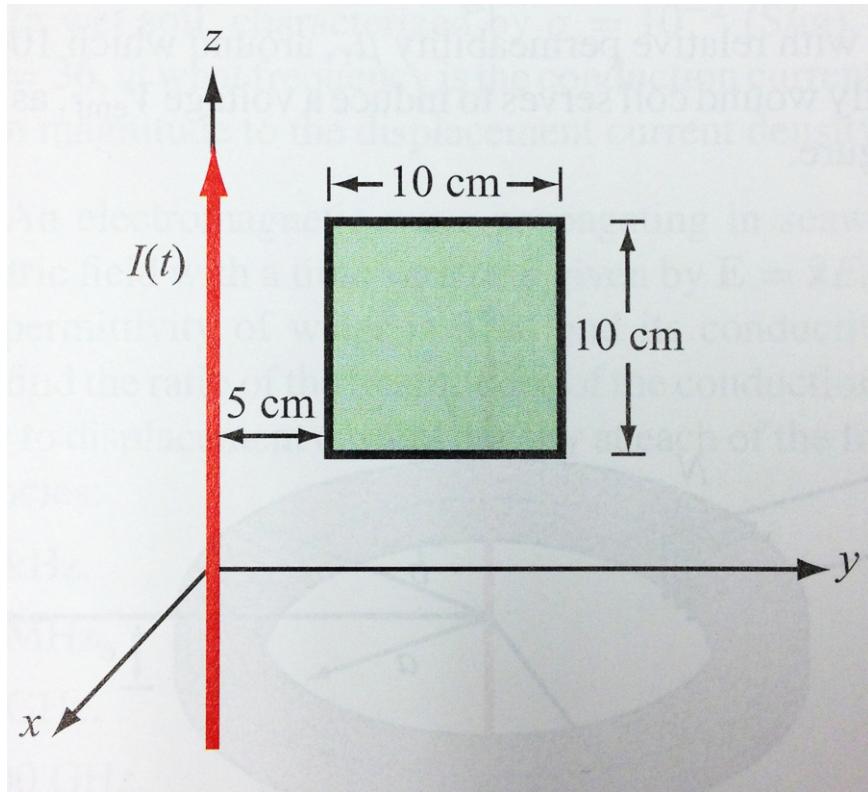


Figure 2: Loop coplanar with long wire (Problem 2).

3. (FAE P6.11) The loop shown in Fig. 3 moves away from a wire carrying a current $I_1 = 10 \text{ A}$ at a constant velocity $\mathbf{u} = \hat{\mathbf{y}}7.5 \text{ (m/s)}$. If $R = 10 \Omega$ and the direction of I_2 is as defined in the figure, find I_2 as a function of y_0 , the distance between the wire and the loop. Ignore the internal resistance of the loop.

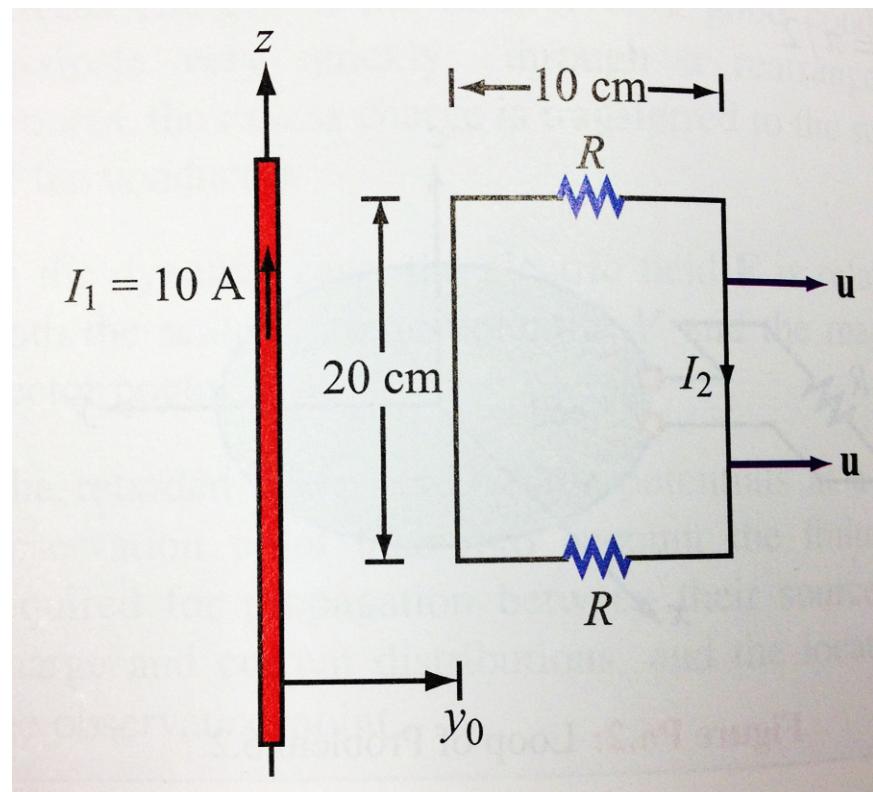


Figure 3: Moving loop of Problem 3.