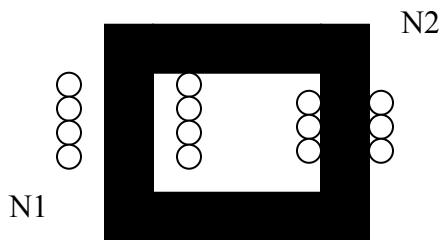
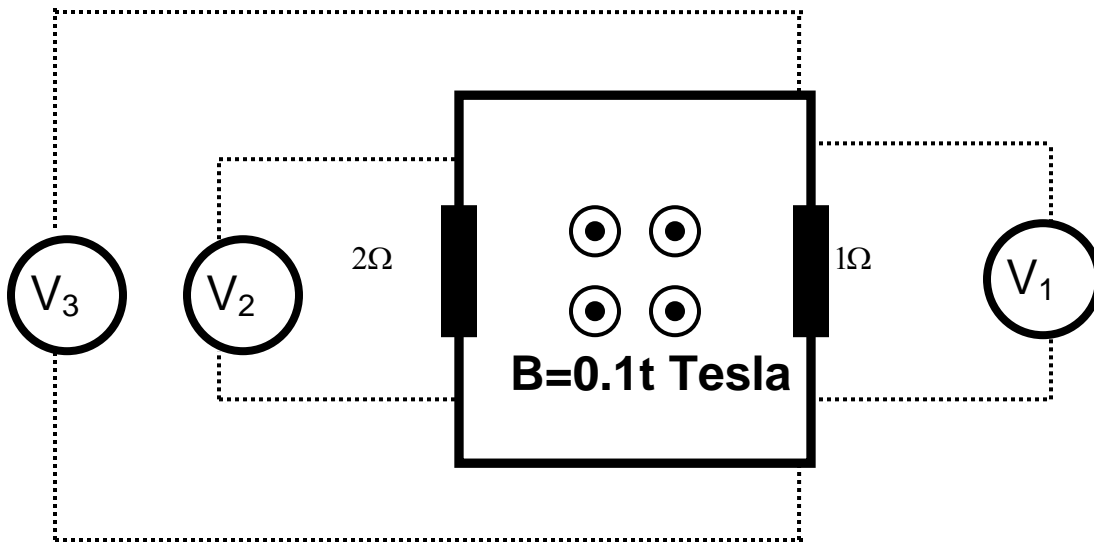


Fields and Waves I
Fall 2008
Homework 7

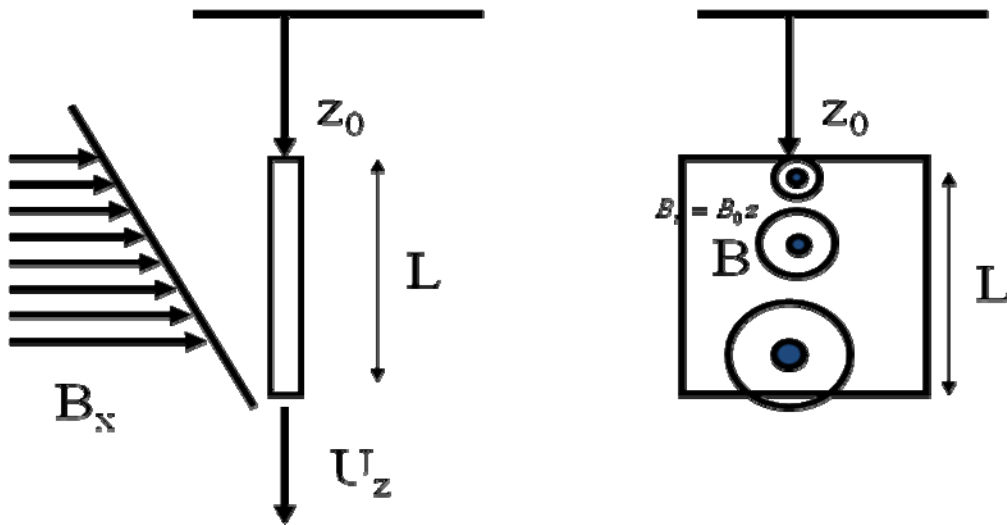
- 1) For the core below we have voltage source connected to the primary winding (N_1 turns) producing a sinusoidal voltage. The secondary winding (N_2 turns) is open circuited. The cross-sectional area is $A = 0.1 \text{ m}^2$. The core length is $\ell = 0.25 \text{ m}$. The flux density in the core is $B = 1.2 \sin(377t) \text{ T}$. There are $N_1 = 100$ turns in the primary coil and $N_2 = 300$ turns in the secondary. Ignore the resistance in the windings. .
- A) Find the applied voltage to the primary and the open circuit voltage on the secondary..
- B) We now connect a load to the secondary (N_2) of 50 Ohms resistance. Find the current in the primary and secondary windings.



2. A Flux density is increasing as $B = 0.2t$ Tesla through a loop of area 1 square meter. The loop has 2 resistors as shown below. There are 3 volt meters attached. What is the reading of each volt meter?



3. In the figure below $B_x = B_0 z$ and we have a square loop of wire traveling in the z direction. Find the EMF in the loop.



4. A square loop 10 cm by 10 cm is coplanar with a long wire with current $I = 2.5\cos(2\pi \cdot 10^4 t)$ Amps. The resistance of the loop is 20 Ohms and we can ignore the inductance. Find the current circulating in the loop.

