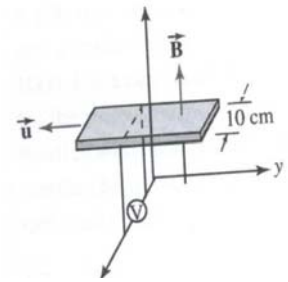
전자장 2 Homeworks

❖ HW#1

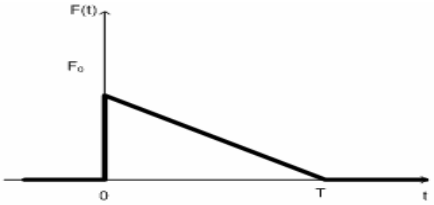
1. A rectangular metal strip of width 10 cm is moving parallel to the x-y plane with a constant velocity of m/s, as shown in the following figure. If magnetic flux density of T exist in the region, determine the reading on the voltmeter. Show the polarity of the induced voltage.



전자장 2 Homeworks

2. The conductivity of seawater is approximately 0.4mS/m and its dielectric constant is 81. Determine the frequency at which the magnitude of the displacement current density is equal to the magnitude of the conduction current density. Comment on the electric behavior of seawater at very low and very high frequencies.

3. For the assumed at in the following figure, sketch
   a) $f(t-R/u)$ versus t,
   b) $f(t-R/u)$ versus R for $t>T$.



전자장 2 Homeworks

4. For a source-free polarized medium where $\rho = 0, \bar{J} = 0, \mu = \mu_0$, but where there is a volume density of polarization $\bar{P}$, a single vector potential π_e may be defined such that

$$\bar{H} = j\omega\varepsilon_0 \nabla \times \pi_e$$

a) express electric field intensity $\bar{E}$ in therms of π_e and $\bar{P}$.

b) show that π_e satisfies the nonhomogeneous Helmholtz's equation

$$\nabla^2 \pi_e + k_0^2 \pi_e = -\frac{\bar{P}}{\varepsilon_0}$$

The quantity π_e is known as **the electric Hertz potential**.

전자장 2 Homeworks

❖ HW#2

- 중간고사 1차 시험문제 풀이
- 연습문제 8-8, 8-11, 8-15, 8-18
- 무한급수를 이용하여 Multiple plane wave 에서의 total reflection을 구해보고 교과서에서 이용한 방식과 일치하는지 여부를 알아보자.

전자장 2 Homeworks

❖ HW#3

- 연습문제 8-28, 8-30, 8-32, 8-33, 8-36, 8-42

❖ HW#4

- 연습문제 9-4, 9-9, 9-13, 9-15, 9-20, 9-25, 9-31, 9-36
- Transmission line voltage에 대한 표현(text 9-151)을 유도

❖ HW#5

- Single conductor waveguide 에서 TEM wave가 존재할 수 없을 이유에 대해서 서술하시오.

전자장 2 Homeworks

❖ HW#6

- 연습문제 9-45, 9-49, 9-50
- 연습문제 10-4, 10-8, 10-13, 10-17