Midterm Review

↳ EMF $\Rightarrow$ $EMF = -\frac{d\Phi}{dt}$ $\Rightarrow$ always work

$= -\int \frac{\partial \vec{B}}{\partial t} \cdot d\vec{s} + \oint (\vec{v} \times \vec{B}) \cdot d\vec{l}$

↳ transformer ↳ motional

↳ displacement current: $\vec{J}_D = \frac{\partial}{\partial t} \epsilon_R \epsilon_0 \vec{E}$

↳ solving Maxwell's eqns + boundary conditions

↳ Phasors $\vec{E}_s = E e^{-j\beta z} \hat{a}_x$

↳ UPW $\rightarrow$ free space

$\rightarrow$ materials $\rightarrow$ general (lossy $\rightarrow \sigma \neq 0$)

↳ lossless ($\sigma = 0$)

↳ good conductor ($\frac{\sigma}{\omega\epsilon} >> 1$)

- γ
- η
- v_p
- $\gamma = \alpha + j\beta$
- α
- $\vec{E} \times \vec{H} \Rightarrow \frac{|\vec{E}|}{|\vec{H}|} = \eta$; $\vec{E} \times \vec{H} \Rightarrow$ dir'n of propagation
- β
- $\vec{P}_{AV} \rightarrow$ power density
- polarization $\rightarrow$ linear, circular + elliptical
  - ↳ RH ↳ RH
  - ↳ LH ↳ LH
- skin depth $\rightarrow \delta = \frac{1}{\alpha}$
  - $\rightarrow$ AC vs DC resistance

↳ tx/RX $\rightarrow$ normal incidence $\rightarrow \Gamma$

$\rightarrow \vec{E}^{inc}, \vec{E}^{r}, \vec{E}^{t}$ $\rightarrow T$