

E157 Lecture 2 Day Plan

Clarify rule of thumb: $\lambda/10 < S$... have problems when λ starts to approach t line length

Any questions before quiz

Quiz + Team Quiz + Talk through solution ← POST YOUR SCORE ON CANVASf

Extracting Velocity from wave equations:

- EM waves: $d^2E/dx^2 = \mu_0\epsilon_0 d^2E/dt^2 \rightarrow \sqrt{1/\mu_0\epsilon_0}$
 - Note: index of refraction = c/c_{medium}
- Sound waves: $d^2p/dx^2 = \rho_0/B d^2p/dt^2 \rightarrow \sqrt{B/\rho_0}$

Derive diffusion equation from rc wire model – $d^2v/dx^2 = rc dv/dt$

- KVL: $V(x+dS,t) - V(x,t) = -r \cdot dS \cdot I(x,t) \rightarrow dV/dx = -r \cdot I$
- KCL: $I(x+dS,t) - I(x,t) = -c \cdot dS \cdot dV(x+dS,t)/dt \rightarrow dI/dx = -c \cdot dV/dt$
- Differentiate KVL: $d^2V/dx^2 = -r \cdot dI/dx$
- Sub in: $d^2V/dx^2 = rc dV/dt$