Homework 2 – Discussion

Wave equation: • homogeneous material

$$\partial_t^2 u = c^2 \partial_x^2 u$$

• inhomogeneous material

$$\partial_t^2 u = \frac{1}{\rho} \partial_x [K(x) \partial_x u]$$

$$= \underbrace{\frac{K(x)}{\rho}}_{= c^2} \partial_x^2 u + \frac{1}{\rho} \partial_x K(x) \partial_x u$$

$$\partial_t^2 u = c^2 \partial_x^2 u + \frac{1}{\rho} \partial_x K(x) \partial_x u$$

"correction" term to account for material change:

strong variations $\partial_x K(x) \gg 0$

weak variations $\partial_x K(x) \sim 0$