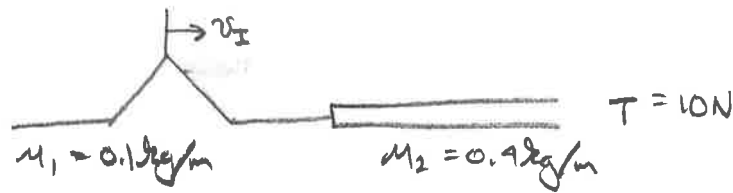


BB 2.1 (3pts)



$$Z_{01} = \sqrt{\mu_1 T} = 1$$

$$Z_{02} = \sqrt{\mu_2 T} = 2$$

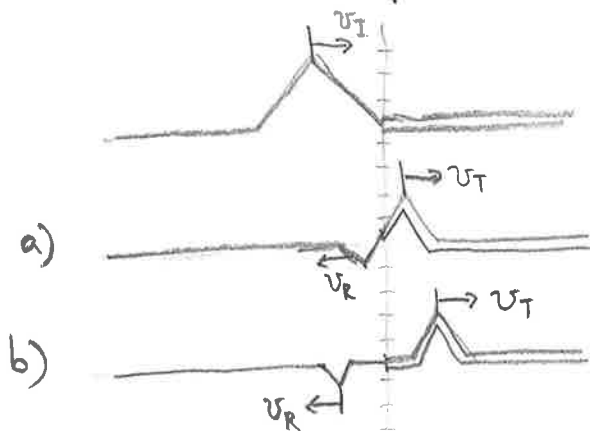
$$\frac{I}{4v} = \frac{v^2}{v}$$

$$\frac{I}{v} = \mu v$$

$$\frac{A_R}{A_I} = \frac{Z_{01} - Z_{02}}{Z_{01} + Z_{02}} = -\frac{1}{3}$$

$$\frac{A_T}{A_I} = \frac{2Z_{01}}{Z_{01} + Z_{02}} = \frac{2}{3}$$

b) Sketch when peak reaches junction, afterwards



$$A_T = \frac{2}{3} A_I$$

$$v = \omega/v$$

$$A_R = -\frac{1}{3} A_I$$

$$c) \frac{E_R}{E_I} = \frac{A_R^2}{A_I^2} = \frac{1}{9}$$

$$\frac{E_T}{E_I} = \sqrt{\frac{\mu_1 T}{\mu_2 T}} \frac{A_T^2}{A_I^2} = \frac{8}{9}$$

$$\begin{aligned} \left\langle S \right\rangle &= \frac{I}{v} \left\langle \frac{\partial^2 \xi}{\partial t^2} \right\rangle \\ &= \frac{T \omega^2}{v} \left(\frac{1}{2} S_0^2 \right) \\ &= T \omega^2 \frac{1}{2} S_0^2 \\ &= \omega^2 T \sqrt{\frac{\mu_1}{T}} S_0^2 \frac{1}{2} \\ &= \omega^2 \sqrt{\mu_1 T} \frac{1}{2} S_0^2 \end{aligned}$$