



Problems Set #2

P2.1 The incident voltage wave on a certain lossless transmission line for which $Z_0=50 \Omega$ and the phase velocity is 2×10^8 m/s is : $V_+ = 200 \cos(\omega t - \pi z)$ v.

- (a) Find ω .
- (b) Find I_+ .

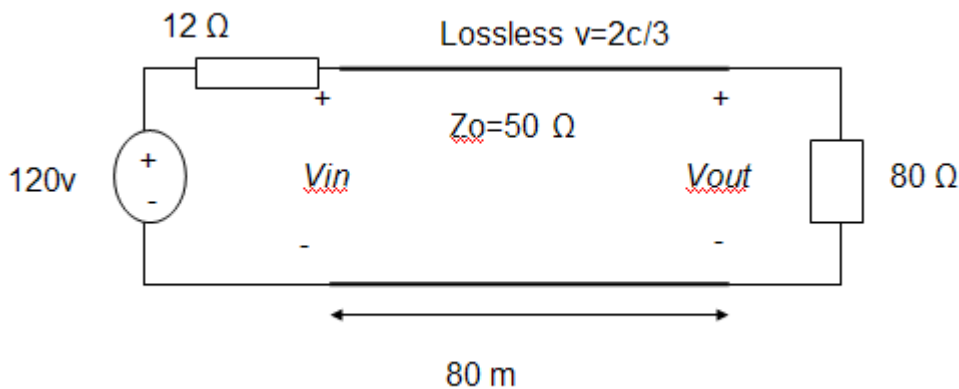
The section of line which $z > 0$ is replaced by a load $Z_L = 50 + j30 \Omega$ at $z = 0$. Find:

- (c) The reflection coefficient at the load.
- (d) V_s^- .
- (e) V_s at $z = -2.2$ m.

P2.2 For the transmission line represented in figure(2.1), find $V_{s,out}$ if $f =$:

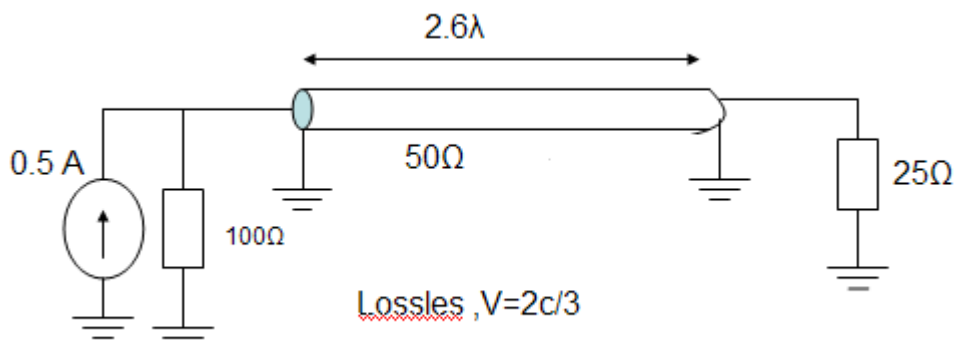
- (a) 60 Hz
- (b) 500 kHz

Figure(2.1)



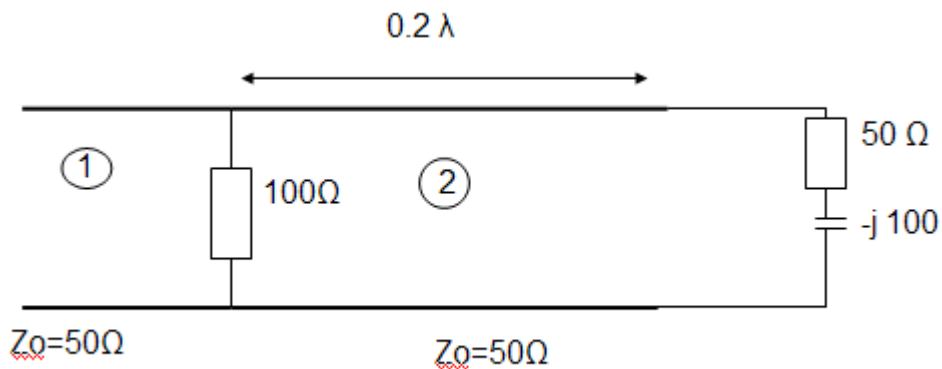
P2.3 Determine the average power absorbed by each resistor in figure (2.2)

Figure(2.2)



P2.4 The line shown in figure (2.3) is lossless. Find S on both sections 1 and 2.

Figure (2.3)



Homework Assignment :

H2.1 A 300Ω transmission line is 0.8 m long and terminated with a short circuit. The line is operating in air with a wavelength of 0.8 m and is lossless.

- If the input voltage amplitude is 10 v, what is the maximum voltage amplitude at any point on the line?
- What is the current amplitude in the short circuit?

H2.2 A lossless transmission line is 50 cm in length and operating at frequency of 100 MHz. The line parameters are $L=0.2\mu\text{H}/\text{m}$ and $C=80$ pF/m. The line is terminated in a short circuit at $z=0$, and there is a load $Z_L=50+j20\Omega$ across the line at location $z=-20$ cm. What average power is delivered to Z_L if the input voltage is 100 v?

Good Luck ☺