

Power system Dynamics and Control
Transmission Line

1. A lossless transmission line, which is open at the receiving end, is energized by a DC source with negligible source impedance, as shown in Fig. 1.

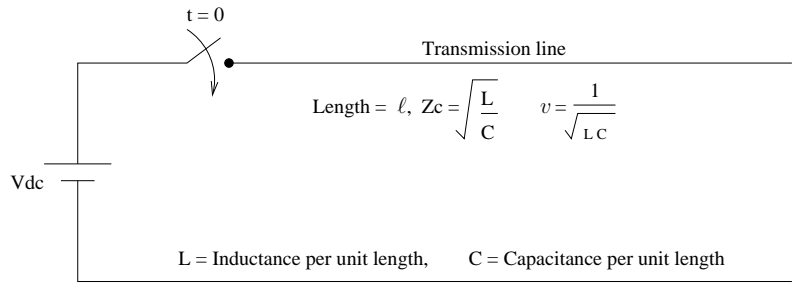


Figure 1:

- (a) Which of the waveforms shown in Fig. 2 gives the response of the voltage at the receiving end ?

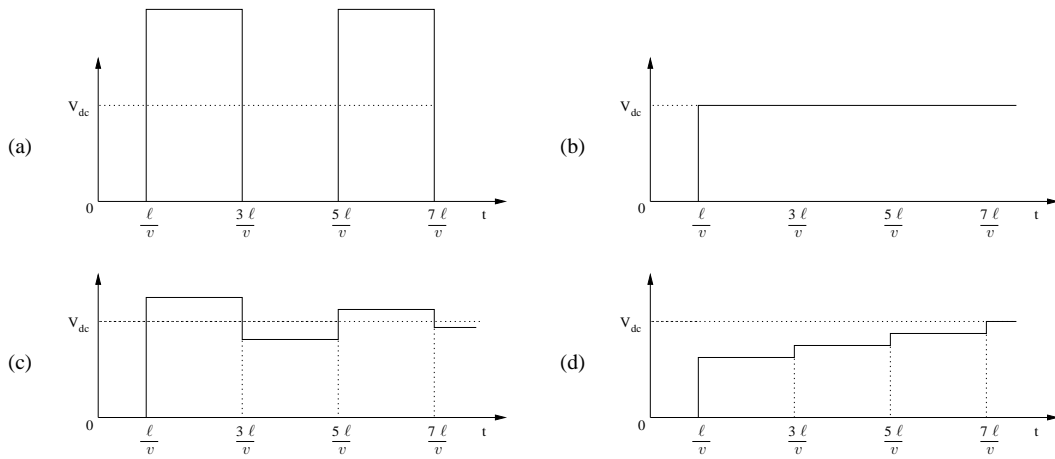


Figure 2:

- (b) If the line is modelled as a *lumped* circuit as shown in Fig. 3, what is the response of the circuit at the receiving end ?

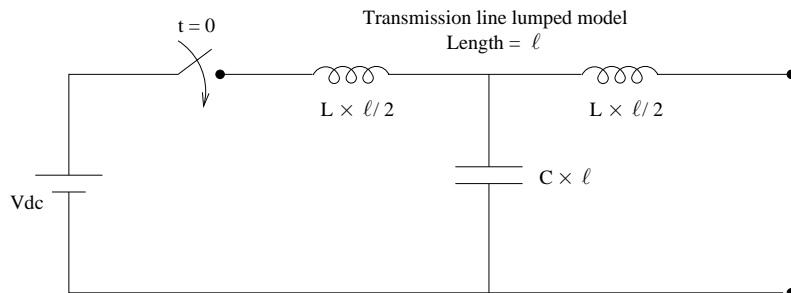


Figure 3:

- (c) Comment on your result.

2. The equations for voltage and current for a lossless two wire overhead line are given in Fig. 4. Note that the voltage $v_1(x, t)$ denotes the voltage with respect to the local ground, at position x from the sending end and at a time t for the first line. Similarly $i_1(x, t)$ is the current through line 1 at position x at time t . Similarly $v_2(x, t)$ and $i_2(x, t)$ are voltage and current for second line

The line is connected to a sinusoidal voltage source of frequency f as shown in Fig. 5. The second wire is also grounded at the sending end as shown. The length of the line is l and it is kept open at the receiving

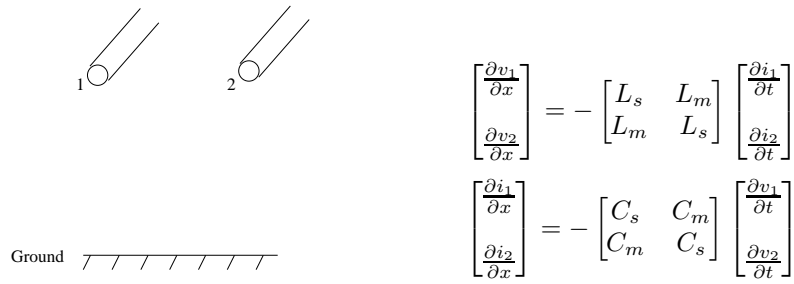


Figure 4:

end. Obtain the expression for the sinusoidal steady state voltage of wire 2 at the receiving end with respect to the local ground.

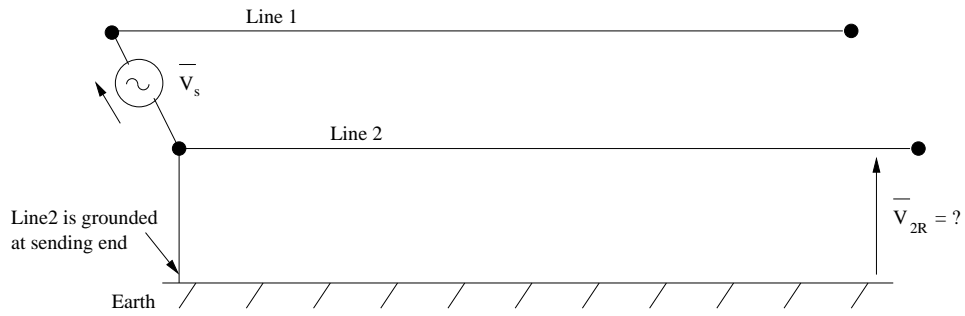


Figure 5: