Blast From the Past!

Exam 1

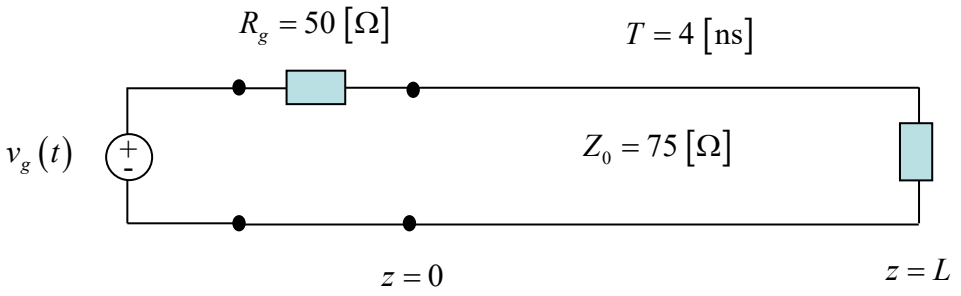
Fall 2021

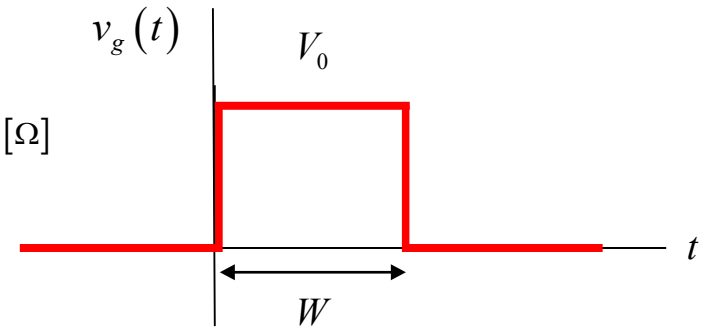
Problem 3 (35 pts)

A voltage source is applied at the left end of a transmission line as shown below. A plot of the generator voltage is shown below. The pulse width is $W = 6\,[\text{ns}]$ and the pulse voltage is $V_0 = 5\,[\text{V}]$.

a) Construct a bounce diagram for this problem that extends to a time of 16 [ns]. (Make your bounce diagram on the next page.)

b) Make an accurate "snapshot" plot of the voltage $v(z)$ on the line at $t = 7.0\,[\text{ns}]$. Make your plot on the graph that is given below on the next page. Label all voltage values on your plot.





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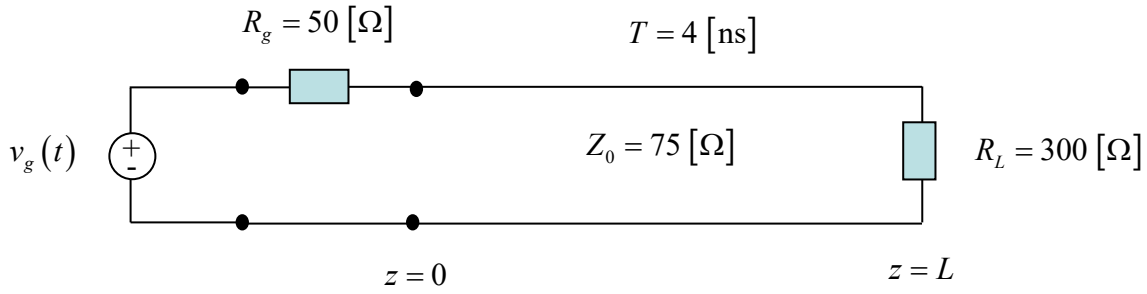
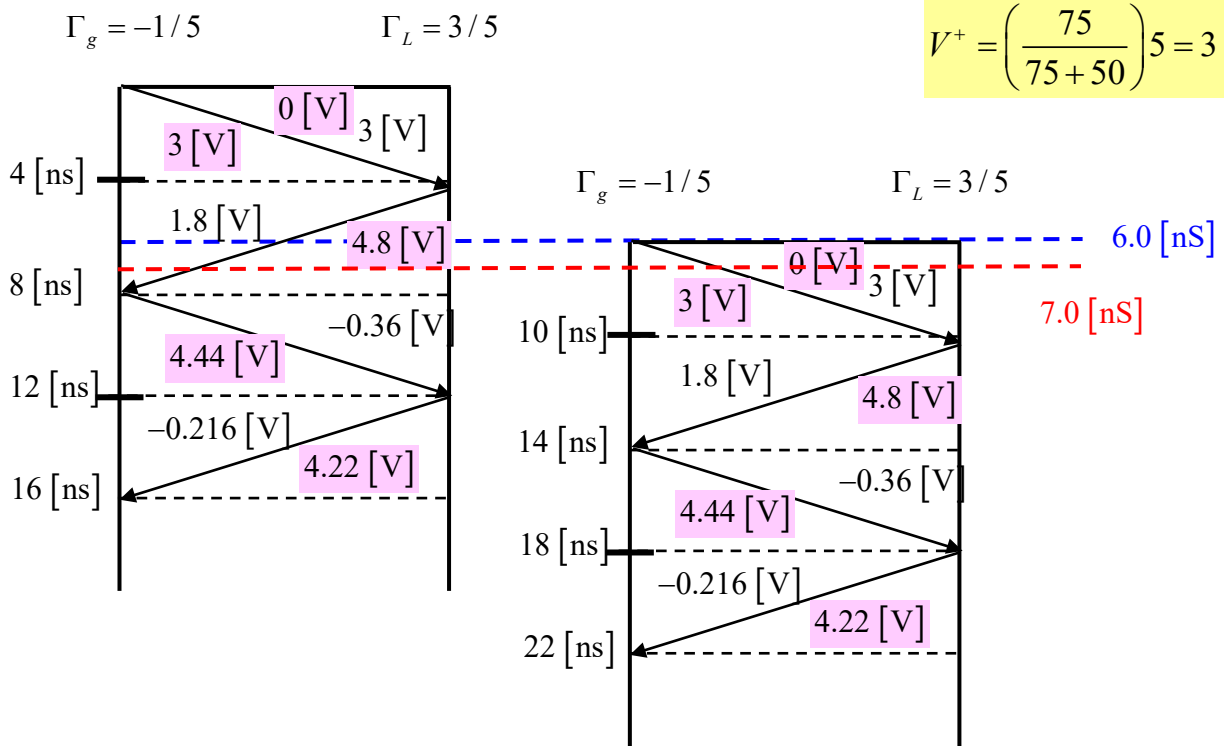


$$V^+ = \left(\frac{75}{75+50}\right)5 = 3\ [\text{V}]$$



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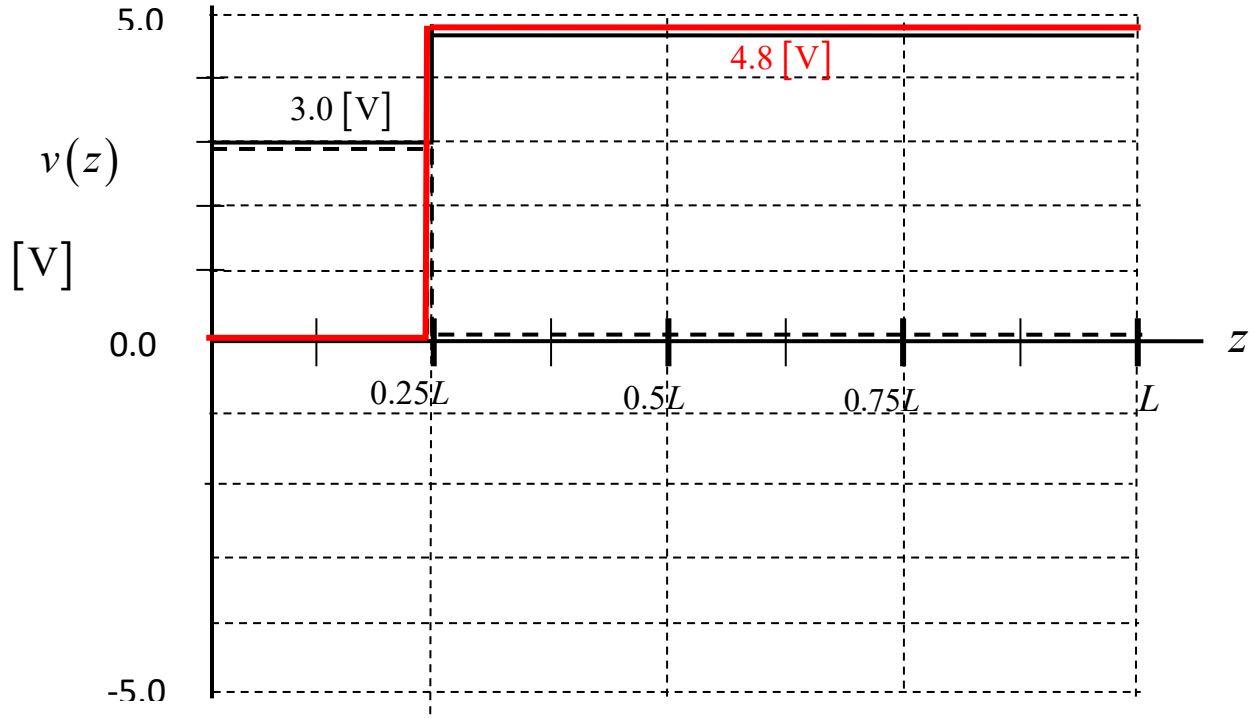
Notes:

- The solid-black wavefront is moving to the left, while the black-dashed wavefront is moving to the right.
- In this problem the width of the pulse on the line is larger than the length of the line! Therefore, you do not see what looks like a digital pulse on the line.

The snapshot due to the original bounce diagram (black solid line) and the shifted bounce diagram (black dashed line) are shown below. The final plot (coming from the black solid plot minus the black dashed plot) is shown in red.



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Final Plot