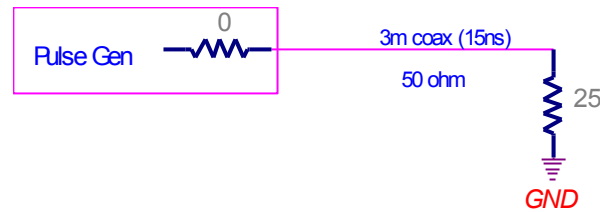
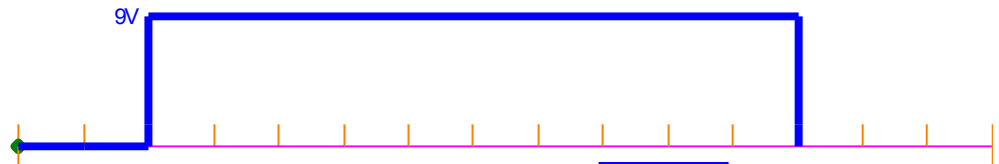


Homework #12 Transmission Lines

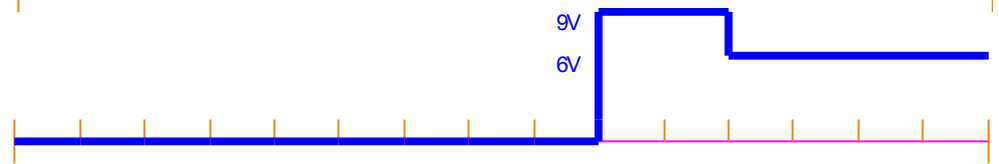
1) An un-terminated pulse generator (i.e. no internal 50Ω resistor) is used to provide a 10ns wide $=10\text{V}$ pulse. This pulse is sent down a 3m cable that is terminated with a 25Ω resistor. You can assume the propagation speed in the cable is $2/3$ the speed of light (i.e. it takes 15ns to go through the cable). Draw the waveform at each of the times below (1ns divisions). Label the height (i.e. amplitude) of the wave where appropriate. The pulse starts at $T = 0$.



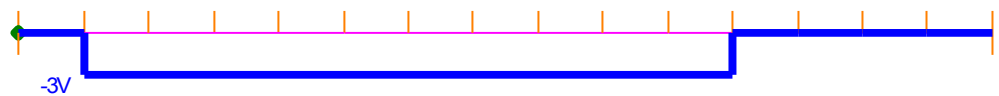
a) $T = 12\text{ns}$
9V pulse moving to the right



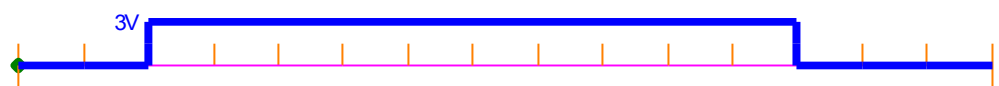
b) $T = 19\text{ns}$
Reflection Coefficient = $(25-50)/(25+50) = -1/3$
9V moving right & -3V moving left



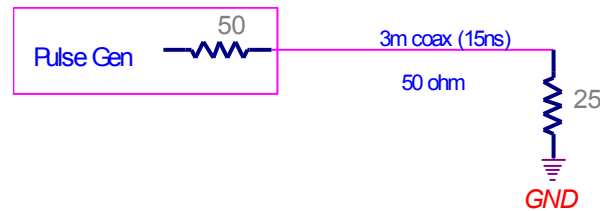
c) $T = 29\text{ns}$
-3V pulse moving left



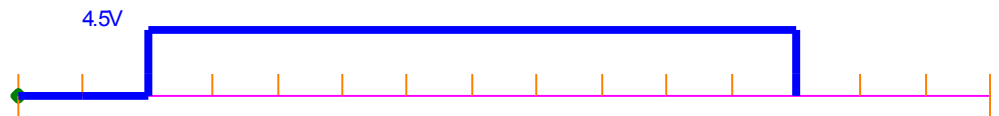
d) $T = 42\text{ns}$
Reflection Coefficient = $(0-50)/(0+50) = -1$
3V pulse moving right



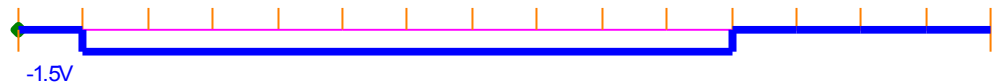
2) The pulse generator in the above example now has an internal 50Ω terminating resistor (everything else is the same); draw the waveform at each of the times below. Label the height (i.e. amplitude) of the wave where appropriate.



a) $T = 12\text{ns}$
4.5V pulse moving to the right



b) $T = 29\text{ns}$
-1.5V pulse moving left



c) $T = 42\text{ns}$
No pulse, absorbed by the 50Ω terminating resistor

