Homework 8

EE 382/L Applied Electromagnetics (Spring 2018)

Monday, March 19, 2018

1) PE11.8a Also, find steady-state currents and voltages at input and load.
2) PE11.9
3) A 200 m long, lossless transmission line (Z_0 = 75 Ω, $u = 2 \times 10^8$ m/s) is driven by a generator with an open circuit voltage of 100 $u(t)$ V and a Thevenin resistance of 50 Ω. It is terminated by a 100 Ω resistive load. Calculate the expected steady-state load current and voltage. Then, find and sketch $V(l, t)$ and $I(l, t)$ for $0 < t < 6$ μs.
4) A 200 m long, lossless transmission line (Z_0 = 75 Ω, $u = 2 \times 10^8$ m/s) is driven by a generator with an open circuit voltage of 100 $u(t)$ V and a Thevenin resistance of 50 Ω. It is terminated by a 100 Ω resistive load. Find and sketch $V(z, t = 1.25T)$ and $I(z, t = 1.75T)$.
5) An 800 m long, lossless transmission line (Z_0 = 75 Ω, $u = 2 \times 10^8$ m/s) is driven by a generator with an open circuit voltage of 100 $[u(t) - u(t - 3\ \mu s)]$ V and a Thevenin resistance of 50 Ω. It is terminated by a 125 Ω resistive load. Sketch $V(z = 0, 0 < t < 6T)$ and $I(z, t = 2.25T)$.
6) A TDR that has an open circuit voltage of 100 $u(t)$ V and a Thevenin resistance of 75 Ω is connected to a length of lossless transmission line (Z_0 = 75 Ω, $u = 2.3 \times 10^8$ m/s) of unknown length with an unknown resistive load. At the TDR terminals, what voltage would initially be measured? If the voltage measured at the TDR terminals changes to 35 V at 1.2 μs, what is the length of the cable and the load resistance?

Due Monday, March 26, 2018.