Homework 5

EE 382 Applied Electromagnetics (Spring 2018)

Monday, February 05, 2018

1) 11.6b
2) 11.11
3) 11.17
4) 11.22
5) An RG-6 coaxial transmission line has the following parameters/specifications at 700 MHz: $L = 0.093\ \mu$H/ft, $C = 16.5$ pF/ft, $u = 0.82074c$, and $\alpha = 6.6$ dB/100ft. (a) Determine the propagation constant, conductance per-unit-length and characteristic impedance of the transmission line if $R = 0.9\ \Omega$/ft. (b) If a 3.6 m length of this line is terminated with a $145 + j30\ \Omega$ load and is driven by a source where $v_g(t) = 100\cos(\omega t)$ V and $Z_g = 75 + j5\ \Omega$, determine the input impedance, input reflection coefficient, input voltage, input current, and time-average power delivered to the line. (c) Also, find the load voltage, load current, and time-average power delivered to the load. (d) How much power was dissipated in the transmission line? What fraction of the input power was delivered to the load? What fraction was lost in the transmission line?
6) A $45 - j50\ \Omega$ load is connected to the end of a 460 cm long lossy transmission line ($\gamma = 0.047 + j\ 13.88\ \text{m}^{-1}$ and $Z_0 = 54.65 - j\ 0.1\ \Omega$) that is driven by a 400 MHz source where $v_g(t) = 100\cos(\omega t)$ V and $Z_g = 50 + j5\ \Omega$, determine (a) the input impedance, input reflection coefficient, input voltage, input current, and time-average power delivered to the line. (b) Find the load voltage, load current, and time-average power delivered to the load.

- Write all complex quantities in phasor form (e.g., $A/\underline{\theta°}$) except impedances & propagation constants which should be in rectangular form.

☺♥ Due Wednesday, February 14, 2018 ♥☺