

EE331- Homework set # 2 (Due 1/26/07)

Problems:

1. Find the distributed parameters of for RG-58/U cable at 1.0 GHz, if the radius of the inner conductor is 0.5 mm and the outer conductor goes from a radius of 1.5 mm to 2.4 mm. The nonmagnetic dielectric material has a relative dielectric constant 2.26 and copper is used as conductor ($\sigma = 5.8 \times 10^7$ S/m). What is the skin depth?

2. Assuming a lossless coaxial cable with the same parameters as in problem 1, determine the
 - (a) propagation velocity
 - (b) Characteristic Impedance.
 - (c) Show how to achieve a characteristic impedance of 75 ohm assuming the inner conductor radius stays the same.

3. A coaxial cable has dimensions $a=1.0$ mm and $b=3.0$ mm, filled with non-magnetic dielectric characterized by ($\epsilon_r=5$ and $\sigma_d = 55.6 \times 10^{-6}$ S/m) operating at 2.0 GHz. Copper metal is used. Determine the following:
 - (a) Parameters of the transmission line
 - (b) The attenuation constant α
 - (c) How much power is lost in 5 meter long cable.
 - (d) If the input power is 2 W, how much power is received at an amplifier located at the end of the coaxial cable.

Text book: Problems 2.10, 2.12,