

ENEE 381 Problem Set #5

11/16/04 - due 11/30/04

These questions will be good to review for the next examination

- (1) RWD 6.4f
- (2) RWD 6.8a
- (3) RWD 6.6d
- (4) RWD 6.12a
- (5) RWD 6.12c
- (6) RWD 6.14b
- (7) RWD 6.14e
- (8) A microwave stripline has 2 parallel conductors 5mm wide spaced 0.1mm apart. The conductivity of the metal of the stripline is 10^7 S/m. The dielectric between the conductors has $\epsilon'=4$, and a loss tangent of 0.02. Calculate the separate attenuation constants on the line caused by the lossy conductors and the lossy dielectric.
- (9) Calculate the fraction of the incident power in a plane wave that passes through a slab with dielectric constant 8, and thickness 10mm, when the wave frequency is 3GHz. How does this change if the wave is a TE wave traveling at an angle of incidence of 30° ?
- (10) A generalized transmission line has the following structures with $L_1=10\mu\text{H}$, $C_1=100\text{pF}$, $L_2=15\mu\text{H}$, $C_2=200\text{pF}$. For each situation plot β as a function of frequency in the pass bands(s) and α as a function of frequency in the stopband(s). For each system say whether this is a backward wave line, and sketch the phase and group velocities at one or two points in the passband(s).