Tutorial on transmission line – Issue 1

Exercise 1 :

A lossy line with real characteristic impedance Zc=50 has an attenuation α=0.02 dB/m and a linear capacity C=0.15 nF/m.

1. Calculate the primary parameters R, L, G of this line..
2. What is the propagation speed ?
3. Determine by what percentage the voltage amplitude has decreased after 1 km and then after 2 km.

Exercise 2 :

A real load R_L is placed at the end of a lossless line with real characteristic impedance $Z_c = 175\ \Omega$. Calculate R_L so that the V.S.W.R. is equal to 2, deduce the value of the reflection coefficient.

Exercise 3 :

A lossy line with real impedance $Z_c = 50\ \Omega$, has a V.S.W.R. = s = 3. The distance between 2 successive voltage maxima is 20 cm and the first minima is located at 5 cm from the load.

1. Determine the reflection coefficient on the load
2. What is the value of this load ?
3. What real load R_m must be placed at the end of a line segment ℓ_m for the input impedance of this line to be equal to Z_L ?