Faculty of Electrical & Electronics Engineering
Antenna & Propagation

Name: ______________________ **ID:** ____________________

Section: ____________________ **Date:** __________________

Tutorial

1. Figure 1 below shows an equivalent circuit of transmission line. A lossless Z_{o}= 100 Ω transmission line L= 0.3 λ in length is terminated in an unknown impedance Z_{L}. The input impedance is measured to be Z_{in}= 40 – j20 *Ω*.

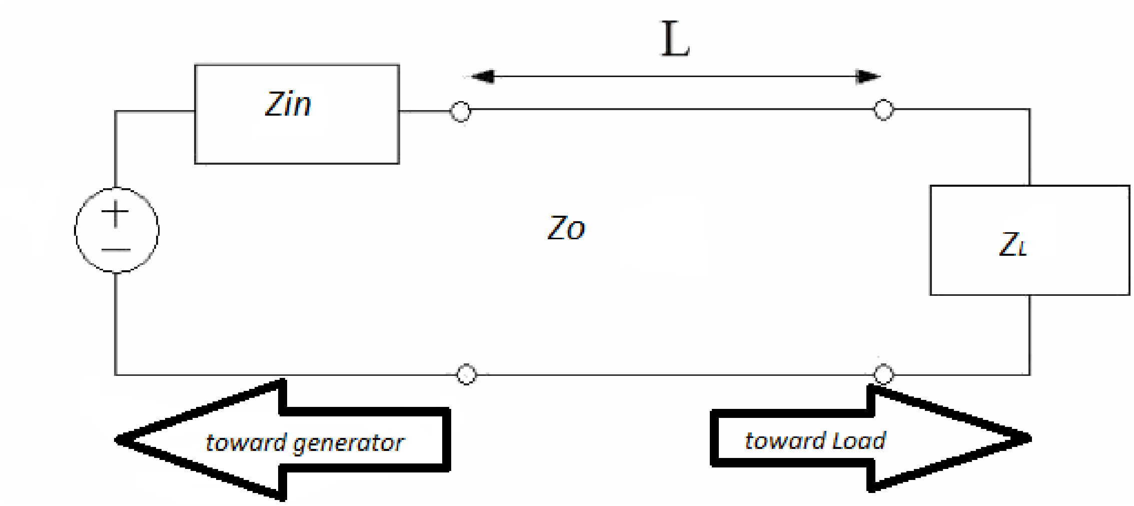

Figure 1: Transmission line equivalent circuit

(i) Use Smith Chart in appendix to find Z_L

(ii) Use the Smith Chart to find SWR

(iii) The reflection coefficient and angle of, τ_L

(iv) The distance from the load to the first voltage minimum.

(v) The distance from the load to the first voltage maximum.

2. A load impedance of 40 - j30 Ω terminates a 50Ω transmission line of 7 cm long carrying 3 GHz signal. Find
   (i) The SWR on the line.
   (ii) The reflection coefficient and angle of, τ_{L}.
   (iii) The distance from the load (cm) to the first voltage minimum.
   (iv) The distance from the load (cm) to the first voltage maximum.
   (v) The input impedance.

3. The 0.1λ length transmission line has a characteristic impedance of 50 Ω and is terminated with a load of $Z_L = 5 + j25\Omega$.
   (vi) Plot the Z_L in the Smith Chart.
   (vii) Find the input impedance.
   (viii) What is the SWR on the line?
   (ix) The reflection coefficient and its angle at the load.
   (x) The reflection coefficient and its angle at the generator.
   (xi) The distance from the load (in λ) to the first voltage minimum and maximum.