Menoufia University
Faculty of Electronic Engineering
Electronics and Electrical Communications Eng. Dept.
Third Year – Spring 2018
ECE 323 - Microwave Engineering
Problem Set #4

جامعة المنوفية

Impedance Matching

[P1] A load impedance $Z_L = 25 + j30$ is to be matched to a 50 Ω line using an L-section matching networks at the frequency f=1 GHz.
   (a) Find two designs using smith chart (also plot the resulting circuits).
   (b) Verify that the matching is achieved for both designs.
   (c) List the drawbacks of matching using L network.

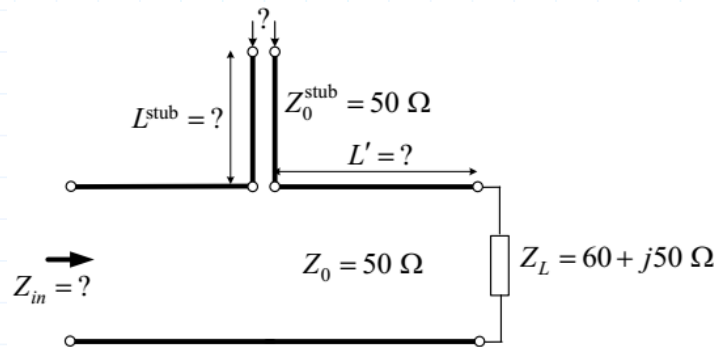[P2] A T-line with $Z_0 = 50$ Ω is terminated with $Z_L = 60 + j50$ Ω as shown in **Fig. P2**.

Fig. P2: Circuit for Problem P2.

   (a) Find the length L' (in terms of λ) of the piece of this T-line such that at $L = L'$ the real part of the input impedance Z'_{in} satisfies $\Re e\{Z'_{in}\} = Z_0$. What is $\Im e\{Z'_{in}\}$ at this position?
   (b) Use a short-circuited series stub of a 50-Ω to cancel $\Im e\{Z'_{in}\}$ connected at L' as shown in **Fig. P2**. What is the length of the stub L^{stub}?
   (c) What is now the input impedance Z_{in} at $L = L'$?
   (d) Repeat part (b) using an open-circuited stub?