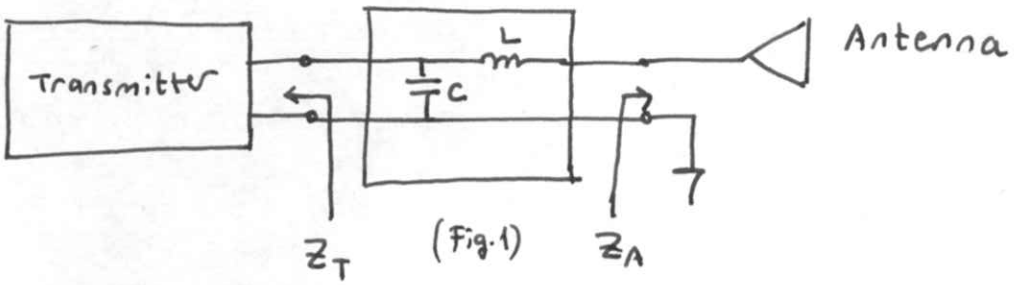
EEE 451 / 551

HW # 11

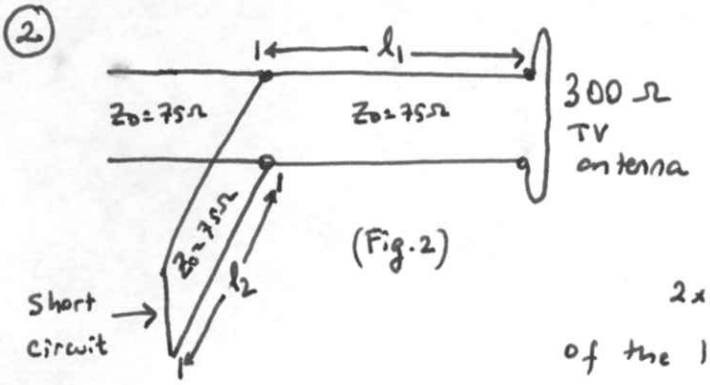
(1)



(Fig.1)

The output impedance of a transmitter operating at a frequency of 2 GHz is $Z_T = 150 + j75\,\Omega$. Design an L-section matching network, as shown in the figure, such that the maximum power is delivered to the antenna whose input impedance is $Z_A = 75 + j15\,\Omega$. Note that the characteristic impedance Z_0 is not given. Therefore, you can select a random Z_0 since it does not affect your solution. Choose $Z_0 = 75\,\Omega$ for simplicity. (Hint: For this problem Z_T should be matched to Z_A^*)

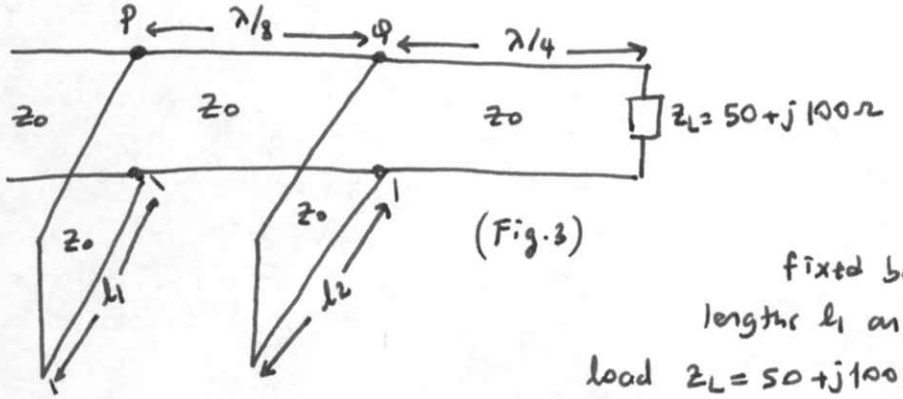
(2)



(Fig.2)

The arrangement shown in Fig.2 is used to match a 300Ω TV antenna to a receiver having a 75Ω input. The 75Ω transmission line has a propagation velocity of 2×10^8 m/sec. Determine the smallest values of the lengths l_1 and l_2 which will achieve matching. The frequency is 90 MHz.

(3)



(Fig.3)

A double-stub tuner is illustrated in Fig.3, where the positions of the stubs on the transmission line are fixed but the short-circuited stub lengths l_1 and l_2 are variable. If the load $Z_L = 50 + j100\,\Omega$ and the characteristic impedances of the line and stubs are both $Z_0 = 100\,\Omega$, determine the shortest lengths l_1 and l_2 to give no reflected wave at point P.