

Homework Two

Impedance Matching and Tuning

Text: Chapter 5, 4th Edition, Pozar

I. Selected problems of the text book (page 270):

1. P 5.1
2. P 5.3
3. P 5.4
4. P 5.9
5. P 5.12
6. P. 5.16(a)
7. P. 5.17
8. 5.20
9. 5.24

II. Additional Problems:

1. You are to match a series RC load, with $R = 500 \Omega$ and $C = 0.3183 \text{ pF}$, to a 50 ohm transmission line at 1 GHz using a single stub tuner with an open-circuit stub. A) Design the stub tuner using an analytical formulation. B) Implement the tuner within ADS. Plot out the parameter $S(1,1)$, which is equal to the input reflection coefficient over the frequency range 0.9 to 1.1 GHz. Show that the load is matched to the 50 ohm line at 1 GHz.
2. The output impedance of Motorola power Transistor MRF 340 (at frequency of 150 MHz in common emitter configuration with $V_{cc} = 27\text{Volts}$) is $38.3 - j 17$. Design a **three elements lumped circuit** to match the output impedance of the transistor to a 50 ohm load **in frequency bandwidth of 30 MHz**. Validate your design using ADS.