

EEL 6936; RF & MICROWAVE CIRCUITS II

CAD EXERCISE #2 (Due 2/19/03)

ANALYSIS OF TRANSMISSION-LINE ELEMENT MATCHING CIRCUITS

The purpose of this exercise is to provide an opportunity to become familiar with the simulation and analysis of ideal transmission-line element matching networks. Example 2.5.2 from Gonzalez "*Microwave Transistor Amplifiers*" will be used. Familiarity with the material in Prof. Weller's procedure *ADS Basics* is a prerequisite. The file is on the course web page: p01-010904.pdf

PART 1. Simulation Procedure, Design 1 Input Matching Network.

1. Refer to Figure 2.5.14, page 167 of Gonzalez. Construct a schematic for the input-matching network. See Figure 1.
2. Simulate S_{11} , S_{21} , S_{12} and S_{22} to obtain the results shown in Figure 2 and Figure 3.
3. Simulate the source admittance (Y_S) and source impedance (Z_S) to obtain the results shown in Figure 4 and Figure 5.

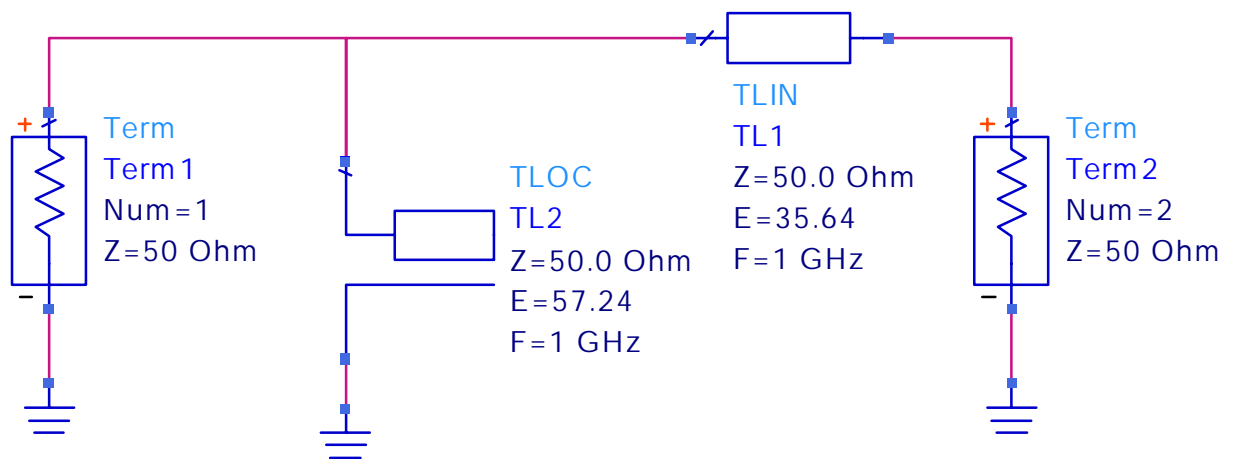
PART 2. Simulation Procedure, Design 1 Output Matching Network.

1. Repeat the Part 1 procedure steps 1, 2 and 3 for the output-matching network. In step 3 simulate the load admittance and load impedance in place of the source admittance and source impedance.

PART 3. Write-up.

1. Submit printed copies of your schematics and simulation results. Your name should be included on each page.
2. Identify the plotted values for Γ_S , Y_S , Z_S , Γ_L , Y_L and Z_L at 1 GHz. Verify that they agree with the text.

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S PARAMETERS

S_Param

SP1

Start=0.5 GHz

Stop=1.5 GHz

Step=.01 GHz

Meas
Eqn

Yin

yin2

our_yin=yin(S22,PortZ2)

Meas
Eqn

Zin

zin2

our_zin=zin(S22,PortZ2)

CLASS EXHIBIT

Figure 1. Schematic Diagram For Matching Network Simulation.

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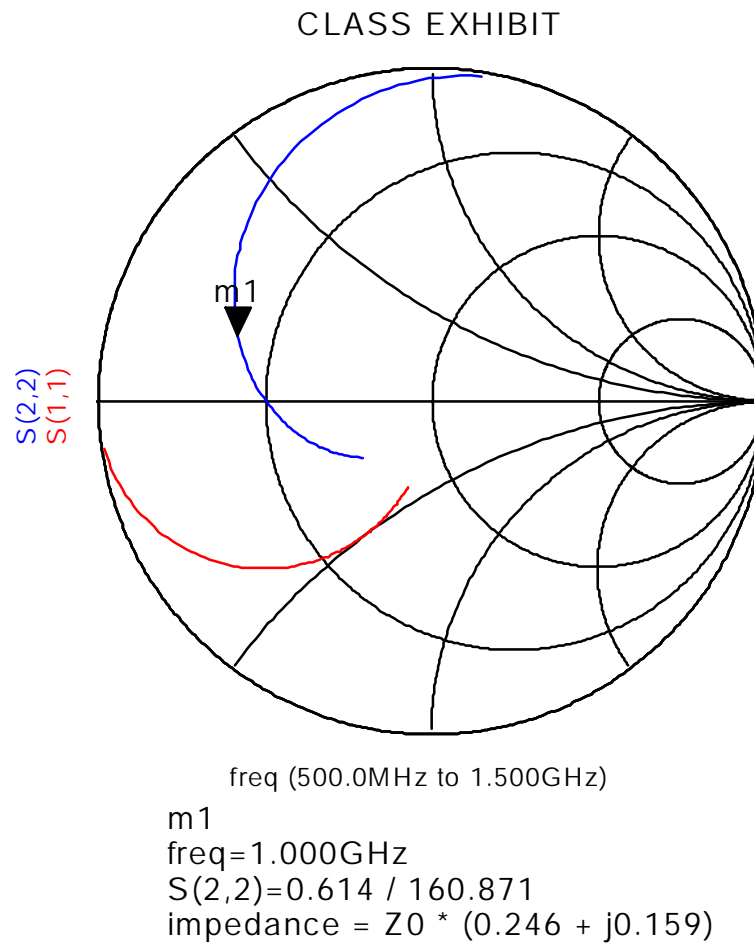


Figure 2. Frequency Response For Γ_s (S_{22}) And S_{11} .

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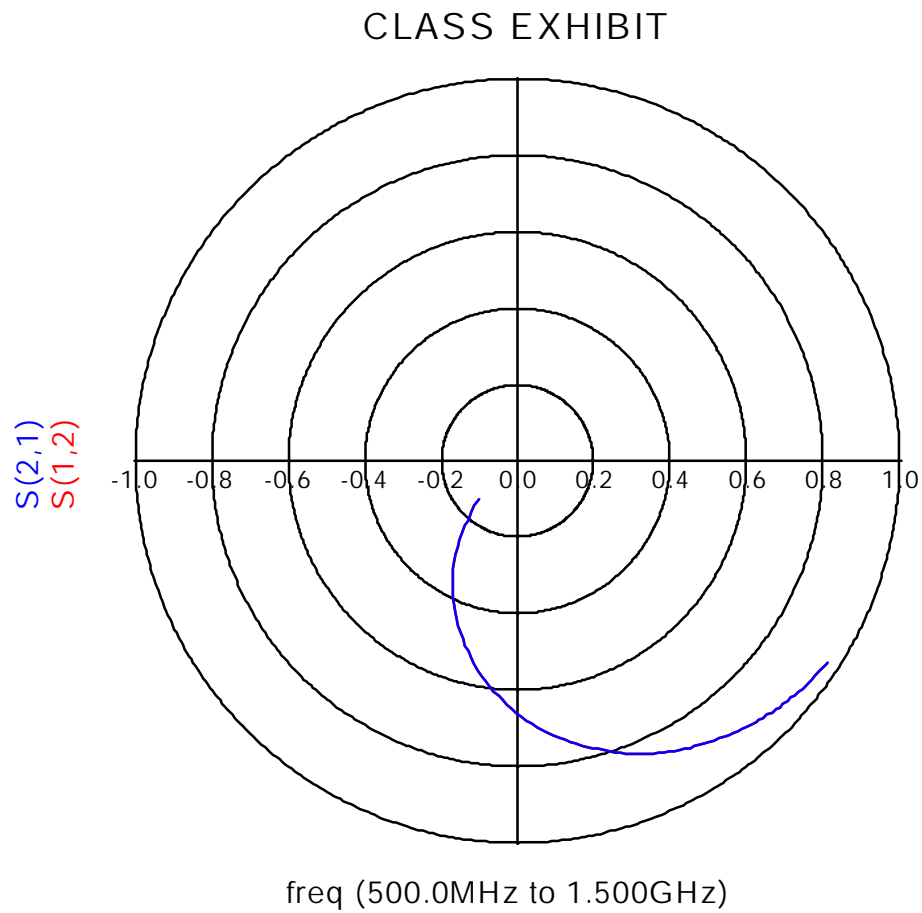


Figure 3. Frequency Response For S_{12} And S_{21} .

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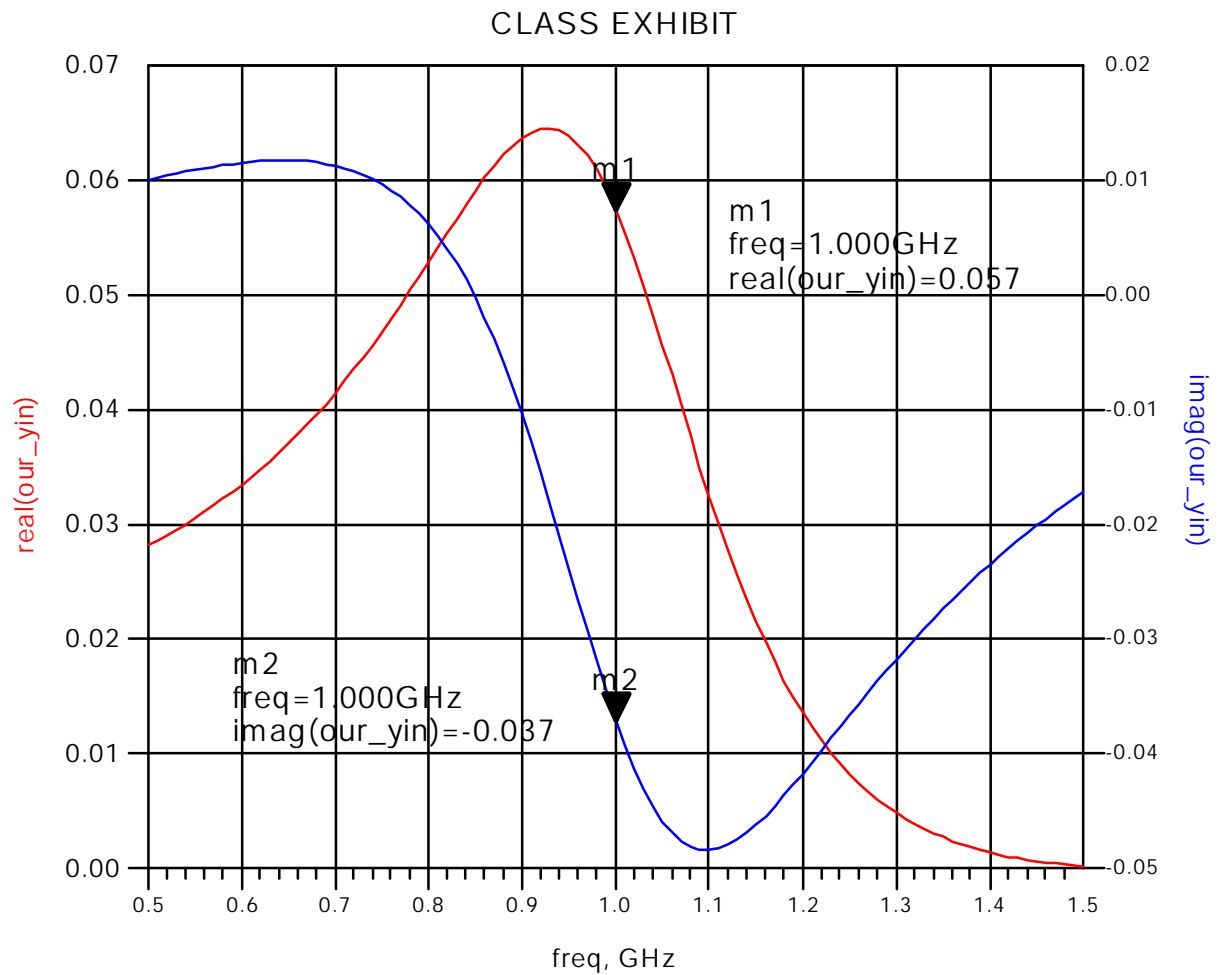


Figure 4. Frequency Response For Y_s .

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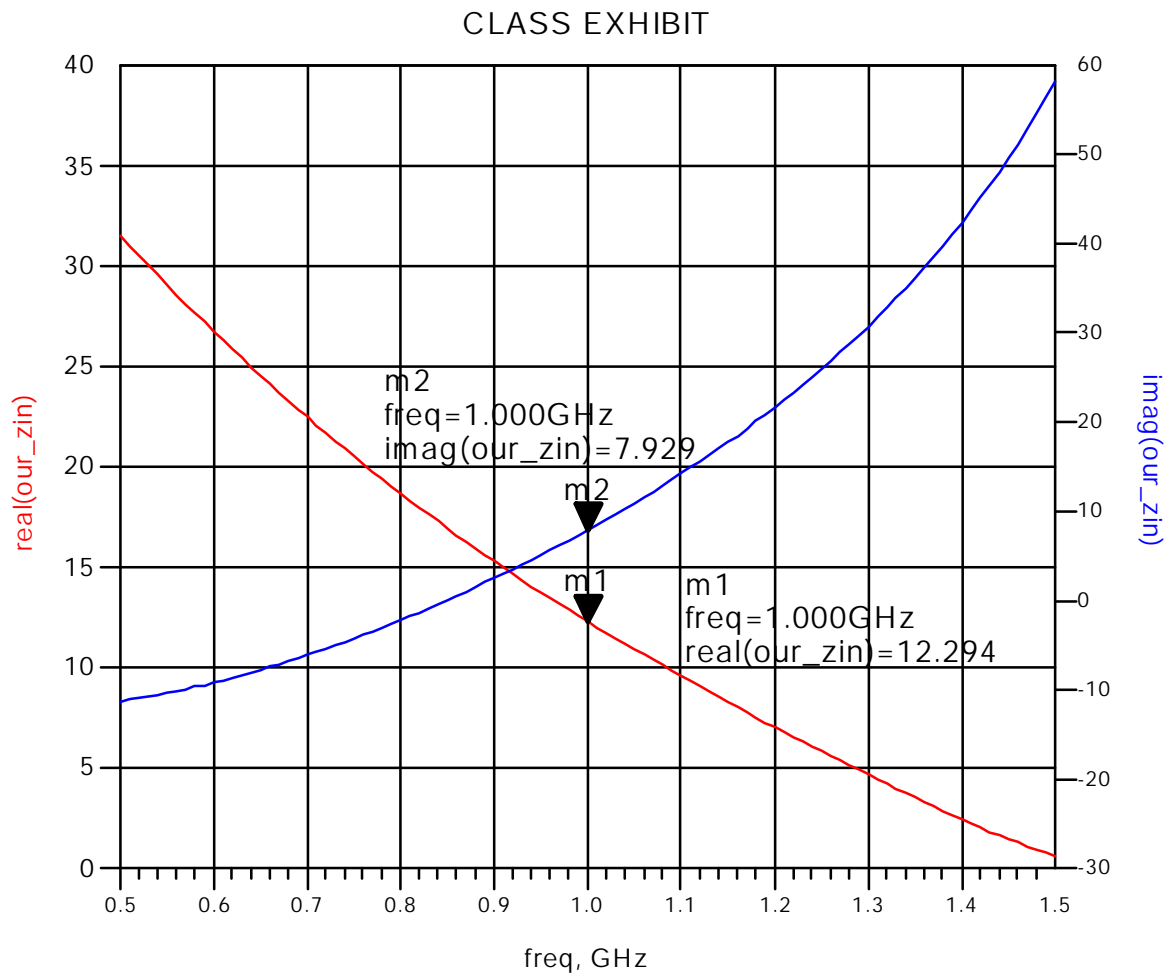


Figure 5. Frequency Response For Z_s .