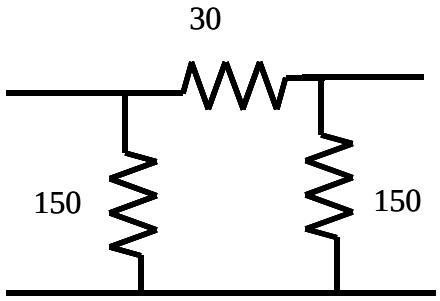
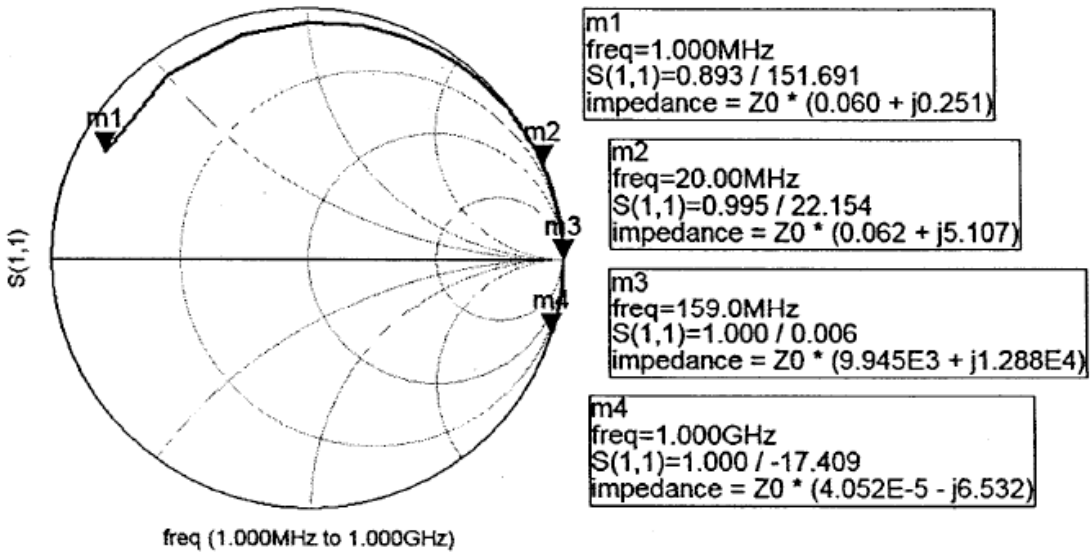
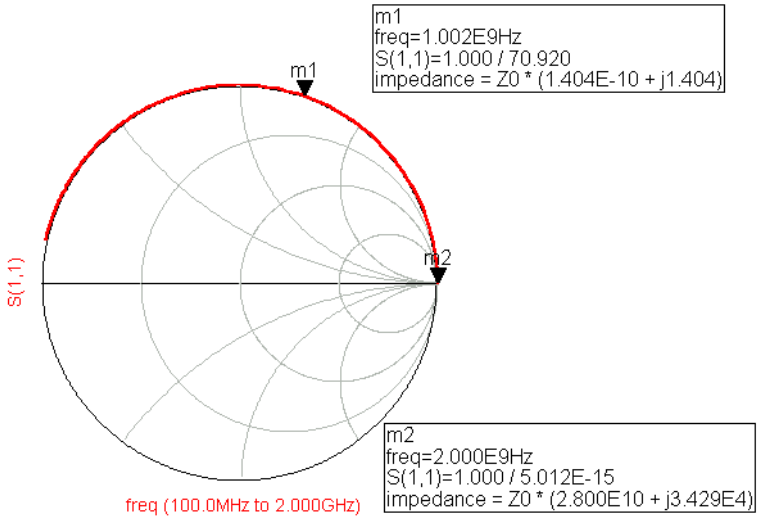
1. a. Calculate the 4 S parameters for the network below assuming a 50 ohm system characteristic impedance.
b. Determine the transducer gain in dB in this system.



2. A component was measured on the network analyzer over the frequency range of 1 MHz to 1 GHz. S11 is plotted on the 50 ohm Smith Chart. Identify the component and construct and determine values for the equivalent circuit representing that component.

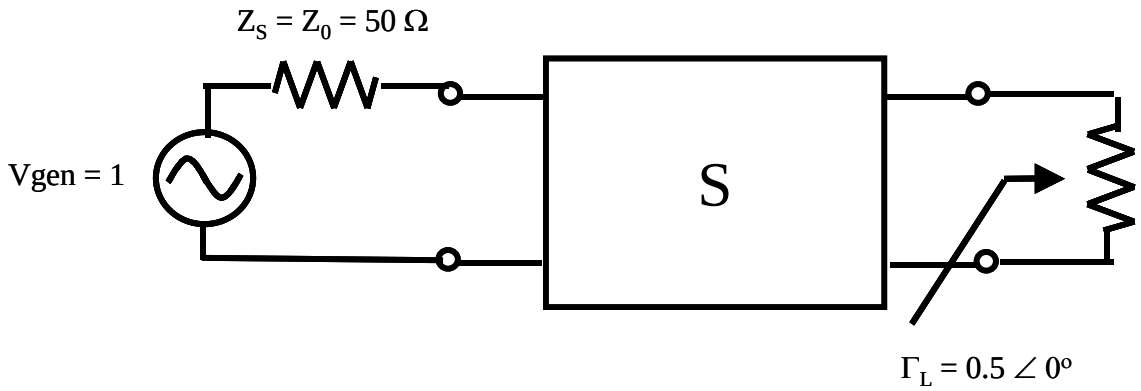


3. A shorted transmission line stub was measured on the network analyzer up to 2 GHz. From the data provided, determine the Z_0 , phase velocity and effective dielectric constant of the transmission line. The physical length is 2 cm.



4. The two port below has the following S parameters:
S11 = 0 ∠ 0 S12 = 0.1 ∠ 0 S21 = 3 ∠ 0 S22 = 0.6 ∠ 180

Z_0 = 50 ohms.
a. Determine the power delivered to the load, P_L, and the power reflected from the input of the network, $P_{reflected}$.
b. Calculate the VSWR seen by the generator.



5. a. Use the Smith chart (download a pdf from the course website under Smith Charts and Prototyping Guides: ZY Smith Chart) to design 4 different lumped element L networks to match a load with impedance Z_L = 20 + j60 to a 100 ohm source.
b. Reading the Smith chart, find Γ_L.
c. Determine component values for the 4 matching networks if the design frequency is 15.9 MHz.
d. Read the ADS Tutorial: Basics. Download the example files in ADS Tutorial #1.
e. Verify 2 of your 4 designs using ADS.