EE433-08 Homework 4 – 20 points
Due Thursday 11/11/2008

Problem 1 – Branch line hybrid

Set up a 4-port branch line hybrid simulation in ADS based on the class notes. Use ideal transmission lines and a design center frequency of 1 GHz. Plot graphs for S11, S21, S31, and S41.

- What would be the usable bandwidth of the coupler for S11dB < -10dB?
- What would be the usable bandwidth of the coupler if S41dB must be less than -20dB? This is the isolation of the hybrid.
- Plot angS21 – angS31. We know this should be -90deg. What would be the usable bandwidth of the hybrid if this angle must be 90+/- 5 degrees?
- The amplitude balance of the hybrid is defined to be AdB=S21dB-S31dB. What would be the bandwidth of the hybrid if this must be 0dB +/- 0.5dB?
- If the hybrid must meet all of the above parameters, which parameter limits the usable bandwidth?

Problem 1 – Double branch line hybrid
Repeat all of the procedures of problem 1 for a double branch line hybrid.