Problem Set 4
Due Tuesday March 18, 2003

1. Design a matching network to deliver 1W of power to a 50Ω load with a supply voltage of 2V (maximum swing of 2V at PA output). Due to space constraints, a lumped element approach is preferred. Assume inductor Q factors of 20 and capacitor Q factors of 30 are available and estimate the insertion loss. Compare a single stage design to an optimal multi-stage design in terms of insertion loss and bandwidth. Design for maximum bandwidth and verify your design with ADS.

2. Design a three-section binomial transformer to match a 300Ω load to a 50Ω line. The maximum VSWR that can be tolerated is 1.1. What is the obtained bandwidth? Plot the reflection coefficient Γ versus frequency f.

3. Repeat the above problem with a two-section Chebychev transformer. Use the approximate theory. Verify your results with ADS.