

ECEn 464 Final Review

1. Transmission lines
2. S-parameters
3. Matching
4. Power dividers/couplers, even/odd mode analysis
5. Amplifiers
 - (a) Gain expressions
 - (b) Conjugate match for maximum power transfer
 - (c) Unilateral devices
 - Constant gain circles
 - Design procedure for specified gain
 - Source and load matching networks
 - (d) Stability - definition, conditional/unconditional, stability circles
 - (e) Bilateral amplifier design
 - (f) Noise figure - definition, noise temperature, cascaded networks
 - LNA design, noise figure circles
 - (g) Dynamic range - noise floor, 1dB compression point
6. Oscillators
 - (a) Basic oscillator design using one-port negative resistance device: design tuning network using oscillation condition and maximum power condition
 - (b) Two-port transistor oscillators: design termination network to obtain a one-port negative resistance device. Use stability circle to find an unstable point or maximize reflection coefficient for purely reactive termination
7. Mixers
 - (a) Diode detector - nonlinear V/I relationship, second order term
 - (b) Switching mixer - Fourier series of switched signal, output frequency components, frequency domain pictures for up/down conversion
 - (c) Single balanced mixers
 - (d) Double balanced mixer
 - (e) Conversion loss