

ECEn 464 Exam 1 Topics

1. Transmission lines

- (a) General expressions for voltage and current on the line
- (b) Reflection coefficient
- (c) Input impedance
- (d) Smith chart
- (e) Quarter wavelength line

2. S-parameters

- (a) Definition
- (b) Reference planes
- (c) Lossless, reciprocal, symmetric networks
- (d) Examples - length of line, $2Z_0$ line, 3dB attenuator, series/shunt reactance/inductance

3. Matching

- (a) Lumped element L section matching - formulas or Smith chart
- (b) Quarter-wave transformer
- (c) Multisection broadband matching - binomial design

4. Power dividers/couplers

- (a) Tee
- (b) Wilkinson divider, even/odd mode analysis
- (c) Quadrature hybrid (branch line coupler)

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