ELEC 3320 MATLAB Project
Due 12/7/09 F

Name: Mason Nixon

*You are expected to develop your own MATLAB code for this project. Teamwork is unacceptable.*

If a constant $|\Gamma_L|$ circle for transmission line terminated in a mismatched load is drawn on a Smith chart, it will intersect the $1 \pm jx$ circle at two points. Thus, there are two fundamental solutions to a stub matching problem. The magnitude of the reflection coefficient $|\Gamma|$ looking into the matching network will ideally be zero at the design frequency. Your task is to plot and compare $|\Gamma|$ vs. frequency for the two fundamental matching networks realized in microstrip. Your microstrip substrate has perfect conductors sandwiching a lossless dielectric.

Given:

Substrate relative permittivity $\varepsilon_r$ = __2.0__

Substrate height $\quad$ h = __30 mils__

Characteristic impedance $\quad$ $Z_o$ = __50 $\Omega$__

Load impedance $\quad$ $Z_L$ = __80 + j40 $\Omega$__

Type of shunt stub: __short__

Design frequency: __2 GHz__

Frequency range for plot: __1 – 3 GHz__

Note that you can solve for the matching network in terms of wavelength, but to find the actual lengths you must design 50 $\Omega$ microstrip for your given circuit board material and determine guide wavelength at your design frequency.

ELEC 3320 MATLAB Project Grading Rubrik
12/7/09 – SMW

| | 0 | 1 | 3 | 5 | score |
|---|---|---|---|---|---|
| 1. Problem Solution | | | | | - |
| a. Neat/organized | | Sloppy work and Poorly organized | Sloppy work or poorly organized | Very neat and Well organized | |
| b. approach | | Illogical, invalid approach | | Logical, valid approach | |
| c. execution | three or more errors | Two errors | One error | flawless | |
| d. Smith Charts | Poorly labeled Sloppy incorrect | | | Well-labeled, Neatly shows each correct solution | |
| e. Circuit sketch (top-down view of microstrip circuit) | | Sloppy sketch, poorly labeled | Sloppy sketch or poorly labeled | Neat, top-down sketch Well-labeled | |
| | | | | | - |
| 2. Program | | | | | - |
| a. Task definition | Task undefined in program heading | Task poorly defined in program heading | Task somewhat defined in program heading | Task well-defined in program heading | |
| b. organization | | Sloppy appearance and Code hard to follow | Sloppy appearance or code hard to follow | Neat appearance and Code easy to follow | |
| c. comments | No comments | | | Program clarified with comments, variables clearly defined | |
| d. code quality | Three or more code errors | Two code errors | One code error | No apparent errors in code | |
| | | | | | - |
| 3. Results | | | | | - |
| a. Performance | Program fails to run | Program runs with error messages | Program runs but generated faulty results | Program works perfectly | |
| b. Discussion | No discussion | Poor discussion of key points and conclusions | Poor discussion of key points or conclusions | Key points summarized; conclusions are drawn | |
| c. $|\Gamma|$ vs freq. plot | Incorrect, sloppy, improperly labeled | | | Correct, neat, properly labeled | - |
| | | | | | - |
| | | | | **TOTAL: (60 total)** | |