Joint PMP and regular course on Microwave Engineering
ECE-PMP572/ECE572 Microwave Engineering Winter 2020

Instructor: Professor Yasuo Kuga, Rm430 EEB, OH: TBD
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Schedule: Lecture: TDB Room: TBD Lab: Rm419
TA: TBD
Prerequisite: Basic EM course, EE361 or equivalent

This course will be based on my lectures notes and references
Textbooks: (recommended but not required)
(1) *Microwave Engineering*, Addison Wesley, 2010. D. Pozar

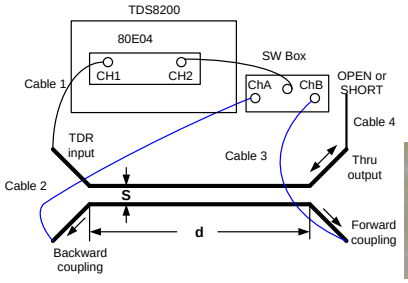
Topics (tentative):
1. Transmission line
2. Transmission line matching techniques.
3. Microwave circuit analysis using S-parameters
4. Electrical properties of materials and measurement techniques
5. Dispersion and anisotropic media
6. TDR, time domain analysis and parameter extraction techniques
7. 90^{o} and 180^{o} hybrid analysis and design
8. Microwave filter analysis and design
9. Design of microwave amplifiers

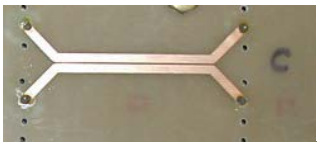
HW/Lab projects (tentative)
- Forward and inverse problem: Estimation of the dielectric constant
- Estimation of the dielectric constant using the reflection method
- TDR time-domain analysis of complex loads
- TDR coupled noise on TLs
- Microwave hybrid design
- Microwave filter design
- Microwave amplifier design

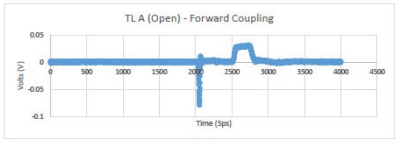
Lab instruments and simulation software: Lab Rm419
Time-domain reflectometer (TDR)
Microwave Network analyzer (NWA)
Ansys ED (Electronics Desktop)

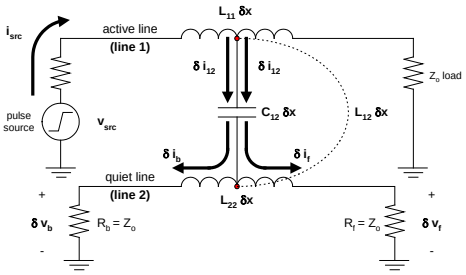
Grading policy: Six to seven HW/projects will be assigned. The final grade will be based on the projects/reports. No exam.

TDR Lab (Forward and backward coupled noise on TL)



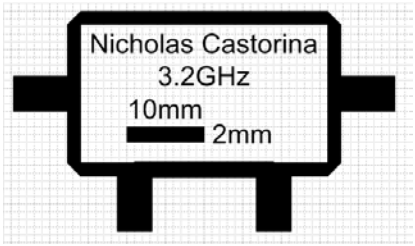


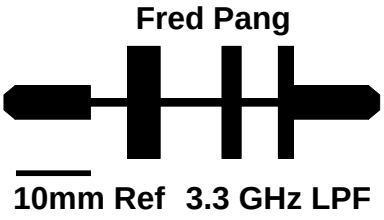




$$V_b = \int_0^d \left(\frac{K_C + K_L}{2v_o} \right) \frac{dV_{src}}{dt} dx$$

Examples of microwave circuits





180 degree hybrid

Low-Pass Filter: fc=3.3 GHz

Example of microwave amplifier using Ansys ED