CIRCUITS ET DISPOSITIFS EN MICRO-ONDES

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| Lecturers : 14.0 | TC : 4.0 | PW : 4.0 | Autonomy : 6.0 | Study : 4.0 | Project : 0.0 | Language : FR

Objectives

The knowledge of the problems in the field of microwaves becomes unavoidable with the explosion of telecommunications, IOT, RFID, wireless power transfer and more generally the development of electronic applications for higher and higher frequencies. The objective of this course is to introduce basic concepts useful in the analysis and design of circuits and microwave devices. The concepts discussed in this course will include understanding a telecommunications system as a whole from the electronic circuit to the transmission of waves.
Application related to the course: telecommunications, RADAR, wireless energy transmission, ...

Keywords : Radio frequencies, microwaves, antennas, adaptation, S parameters, waveguide, resonant cavity, filters.

Programme

1) Microwave circuits
- Transmission lines, equation of the telegraphists, microstrip line, waveguide.
- Impedance matching, S Parameters.
- Passive circuits, filter design, directional couplers.

2) Electromagnetic devices in microwaves
- Resonant cavities, dielectric resonators.
- Antennas, radiation pattern, gain, antenna network, power transfer evaluation in telecommunications and radar

TP: complete study of a microwave: operation of the magnetron, waveguide, resonant

Learning outcomes

- Master the concepts and methods of adaptation of impedances allowing the optimization of the power transfer between two systems.
- Use S parameters : transmission and reflection between two systems.
- Dimension of a waveguide and a microstrip line
- Design a filter

Independent study

Objectifs : Know how to use a circuit simulation tool (ADS) and a 2.5D microwave electromagnetic simulation tool adapted to the printed circuit.
Study and dimension from a specification of the systems seen in progress as well as certain systems mentioned but not studied in detail, in particular the active systems: mixer, frequency doubler, ...

Méhodes : 1 BE of introduction to ADS software, the students are divided into 3 groups, each group working on a different subject.
6 hours are dedicated to this group work which has for deliverable a report and a presentation, the restitution must allow to share the additional courses to all

Core texts

D. Pozar., *MICROWAVE ENGINEERING*, Addison-Wesley, 1990

Assessment

Final mark = 50% knoledge + 50% know-how
Knoledge = 100% final examen
Know-how = 100% continuous assessment