

Synthesis of High Frequency Equivalent Electrical Circuits



Component

École Nationale
Supérieure
d'Électrotechnique
d'Électronique
d'Informatique
d'Hydraulique
et des
Télécommunications

In brief

- > **Amety's Code:** M34HOQUV
- > **Open to exchange students:** Yes

Presentation

Objectives

Know how to determine the equivalent electrical circuit of any passive RF devices based on physical considerations and controlled approximations
Know how to physically analyze the properties of the electromagnetic field in any passive RF devices - Know how to use equivalent electrical circuits for the synthesis of RF functions

Description

I. Symbolic representation of modal sources of electromagnetic fields

I-1- Thevenin generator for modeling a modal electric field source

I-2- Norton generator for modeling a modal current density source

II- Formulation and solution of boundary value problems with modal electromagnetic field sources

II-1- Equivalent circuit of RF devices excited by modal sources

II-2- Formulation of the boundary value problem based on Kirchhoff's and Ohm's laws

II-3- Numerical solution of the boundary value problem

II-4- Extraction of an equivalent electrical circuit from HF devices

III- Applications

III-1- Equivalent inductance of a metallized hole in a microstrip line

III-2- Input impedance of a rectangular metal and hollow waveguide cavity

III-3- Equivalent circuit of a width jump in a microstrip line

V- Prospects in the field of electromagnetic modeling of guiding structures using equivalent electrical circuits

Pre-requisites

The course "Physical Analysis of Guiding Structures" in 2A Semester 8