

Propagation in Transmission Lines



Component

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



Semester
Automne

In brief

- > **Amety's Code:** N5EE05C
- > **Open to exchange students:** Yes

Presentation

Objectives

- By the end of this course, students will be able to:
- understand the intrinsic parameters of a line
 - understand the specifications on a datasheet
 - understand the phenomenon of reflection
 - understand the principles of adaptation
 - know how to measure line performance
 - know how to diagnose faults in lines
 - understand the phenomena of coupling and crosstalk

Description

In the first course, based on the physical phenomena studied in the electromagnetism course, an RLCG circuit model (telegrapher's equation) is explained. The concepts of characteristic impedance, propagation constant, wavelength, and attenuation constant are derived from this. Group velocity, phase velocity, and line power handling are introduced.

In the second class, the line is represented as a quadripole. The phenomena of reflection and adaptation are explained on a loaded line. The phenomenon of standing waves is illustrated.

In a final lesson, the diffraction matrix is explained. The network analyzer used to characterize it is presented. Reflectometry techniques are detailed. Cable insulation and crosstalk are presented.

Pre-requisites

Materials

Electromagnetism: propagation phenomena

Basic concepts of circuits (four-pole networks, node and mesh laws, etc.)

Solving partial differential equations

Complex calculations