Modeling by physical analogies & analysis

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

Semester
Printemps

In brief

> **Code:** N6EE03A

Presentation

Objectives

-       Skill in energy system modelling by using electrical equivalent circuit models whatever the physical domain (electrical, mechanical, hydraulic, magnetic, thermal)

-       Ability to analyse the time and frequency behaviour of specific transfer functions and apply the root locus method for stability analysis.

Description

Introduction to physical analogies in energy systems:

- Generalised energy variables and generalised power variables.

- Elements of physical systems: source, dissipative or energy storage elements (I or C elements), interconnecting elements (generalized nodes, transformers and gyrators)

- causality in physical systems.

Analysis of continuous linear systems

- linearization of a nonlinear system.

- Temporal analysis: influence of poles and zeros in transfer functions.

- Stability analysis by the root locus method.

Pre-requisites

Electrical circuits, Laplace Transform