Discrete and Continuous Systems Optimisation

ECTS
5 crédits

Hourly volume

Introducing

Description

Objectives

At the end of this module, the student will have understood
and be able to explain (main concepts):
- different approaches to analyse, evaluate the performance of discrete event systems through different
models (deterministic or stochastic, graphs) and to optimise them (linear programming)
- the optimisation methods for continuous systems :
-static (first and second order conditions)
- dynamic (dynamic programming)
- their applications to optimal or model predictive control mainly for linear systems

The student will be able to:
- to analyse, model and solve an optimization problem of
discrete systems by a linear programming or a graph, by
applying relevant algorithms (simplex, usual graphs and
networks algorithms, combinatorial optimization)
- to model and to characterize: stationary Makovian processes with discrete state space (chains) and
continuous or discrete time, queuing systems, to analyse
their transient and stationary behaviours, to evaluate their
performances
- to model a discrete event systems by Petri nets and to analyse the properties by enumerative and structural approaches.
- to formalise and solve a quadratic criterion, nonlinear,
without or with constraints optimisation problem in the case
of systems with real variables
-to develop and design an optimal control law (LQG) for a
linear or linearized process.

Necessary prerequisites

Linear algebra ¿ Probabilities ¿ Dynamic systems (state concept) - Basic elements in logic systems and Petri nets.

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

Toulouse