Discrete and Continuous Systems Optimisation

ECTS
5 crédits

Hourly volume

Introducing

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.

Practical info

Location(s)

Toulouse