SCIENCES ET INGENIERIE DES RESEAUX

ECTS
5 credits

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

In brief

Code: N8EN18

Presentation

Objectives

The purpose of this unit is threefold, addressing the theoretical and practical aspects of network performance, quality of service and the analysis of complex networks.
The goal is, first, to learn to analyze and evaluate the performance of computer systems from stochastic models. We will first study the Markov decision process, which is a general framework for optimizing stochastic models, and in particular Markov chains. We will then study the performance of the most important scheduling policies in practice. We will finish by studying the allocation of resources in networks, with particular attention to TCP
Then we will learn how to analyze complex and dynamic networks and model them using random graphs. Master the notions of small worlds, preferential attachment, temporal graphs. The problems of network analysis are applied to social networks, dynamic network analysis, link analysis, robustness analysis, pandemic analysis (infection times, recovery times, ...), web links analysis (page ranking, ...), measures of centrality, ...
Master spectral analysis tools for complex networks, measurement tools, analysis of dissemination phenomena, communities, ... and interdependence between networks (degrees of correlation, ...).