Modeling and Simulation of Complex Systems

The ubiquity of complexity has tremendous consequences for the future of science, technology, and society, and in a sense our whole world view. (Stephen Wolfram)

This research Project aims at the development of models and methods for representing, simulating, monitoring and controlling systems and processes. The main characteristic of the systems and the processes under consideration is complexity, in its various aspects, such as the existence of highly nonlinear behaviors or of random phenomena, the coexistence of multiple scales, the large number of components and the multiplicity of their interconnections, the knowledge incompleteness of the underlying mechanisms, the large sets of data. In investigating complex systems a multisectorial / interdisciplinary approach and advanced techniques are mandatory and represent the core of the present Project.

The Project “Modeling and Simulation of Complex Systems” of the ICT Department of CNR aims at integrating the various aspects that enable to characterize complex systems. The research activities focus on the development of tools which can be considered as bricks for the studies of complex systems and can be classified into the following areas: Models, Algorithms and Data. The Project covers different modeling and algorithmic aspects, both deterministic and stochastic, of some complex problems related to the Future Internet.