

## **A generic model simulating two temporalities of evolution in the European system of cities**

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SIMPOP2 and EUROSIM are two versions of a same generic multi-agent systems model. The model is built in cooperation between geographers (UMR Géographie-cités) and computer scientists (LIP6). The model simulates the evolution of a network of interacting cities. The main interaction is the competition for resources (population, goods, information, innovation). The cities produce and invent new resources and exchange them on a spatialised market. Cities are heterogeneous agents that differ according to their functional specialisation (central market places, territorial capitals and production of non central manufacturing goods or services). They are also different according to their strategy, as defined by an agent called “governance”. Two applications are presented here:

- the first one (model SIMPOP2) is theoretical and aims at simulating the emergence and the evolution of the European system of cities, from the end of the Middle Ages to nowadays. Two main features are to be reproduced by the model: 1) the persistency of a hierarchical configuration both at macrogeographic level of the system as a whole and in the individual trajectories of cities; 2) the dramatic increase of contrasts in city sizes since the first industrial revolution. The key parameters that will be experimented are: i) the succession of innovation cycles of different temporal scales and their more or less rapid diffusion within the system of cities; ii) the increasing spatial range of exchanges due to the progress in communication technologies.

- the second application (model EUROSIM) refers to the European urban system during the last 50 years. Urban functions and parameters are described more precisely, in order to reproduce as accurately as possible the operating and evolution of the system during the last decades. In that case, simulations are used for testing scenarios and making predictions at a 50 years horizon, according to migration policies, demographic expectations from different sources, and the evolution of the international boundaries barrier effects as a function of enlargement of European Union.