

Cellular automata modelling of multiscale urban systems: concepts, models and applications

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Abstract

Cellular Automata (CA) models are used to simulate land use change, usually at a regional level considering land use dynamics at a local level. They consider regular cells, with fixed neighbourhoods, operating local transition rules that are usually applied to the entire region. We present a set of CA models that address issues of scale, cell form, neighbourhood definition, accessibility and calibration. A multiscale CA modelling framework aims to simulate land use dynamics at different spatial and time scales: a macroscale CA simulates the aggregated land use change at a regional level; and a microscale CA that simulates land use allocation at local scale. We use irregular cells and variable neighbourhoods at both scales. Model calibration is made using the particle swarm optimization heuristic. We will present the main features of the models and of the calibration process with case studies from Portugal and Spain.

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