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**Clustered simple cell mapping: an extension to the simple cell mapping method.** (English)

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Summary: When a dynamical system has a complex structure of fixed points, periodic cycles or even chaotic attractors, Cell Mapping methods are excellent tools to discover and thoroughly analyse all features in the state space. These methods discretize a region of the state space into cells and examine the dynamics in the cell state space. By determining one or more image cells for each cell, the global behaviour within the region can be quickly determined. In the simplest case – Simple Cell Mapping (SCM) method - only one image corresponds to a cell and usually a rectangular grid of cells is used. In typical applications the grid of cells is refined at specific locations.

This paper, however, introduces a different approach, which is useful to expand the analysed state space region to include all features which properly characterize the global dynamics of the system. Instead of refining the initial cell state space, we start with a small initial state space region, analyse other interesting regions of the state space and incorporate them into a cluster of cell mapping solutions. By this approach, trajectories escaping the original state space region can be followed automatically and additional objects in the state space can be discovered.

To illustrate the benefits of the method, we present the exploration of the phase-space of the *micro-chaos map* – a simple model of digitally controlled systems.

**MSC:**

68 Computer science

92 Biology and other natural sciences

**Keywords:**

discretized state space; adaptive global analysis; algorithm; micro-chaos

**Software:**

Dynamics

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**References:**

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