A Cellular Automaton for the Simulation of Dynamics in a Complex System

*W.F. Yuan¹, L. Wei¹

¹School of Manufacturing Science and Engineering, Southwest University of Science and Technology, China.

*Corresponding author: yuanweifeng@swust.edu.cn

Emergency evacuation is a type of complex dynamics since it is dependant on various parameters. On the other hand, cellular automaton (CA) has been proven to be one of the useful tools for the simulation of such a complex system. Therefore, a CA algorithm used to model the evacuation of human beings is presented in this paper. According to the proposed method, the evacuation domain is discretized into a regular grid of cells, each of which may be vacant or occupied by an evacuee. Each evacuee selects an exit at each time step to move towards based on two factors, viz. distance and occupant density. To make the modelling more reasonable, human behaviour is also taken into account in the CA approach. Numerical results show that the proposed algorithm is a promising method in evacuation modelling.

Keywords: Cellular automaton, Evacuation modelling, Human behaviour