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Urban Growth Prediction Modelling Using Fractals and Theory of Chaos

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ABSTRACT

Urban growth prediction has acquired an important consideration in urban sustainability. An effective approach of urban prediction can be a valuable tool in urban decision making and planning. A large urban development has been occurred during last decade in the touristic village of Pogonia Etoloakarnanias, Greece, where an urban growth of 57.5% has been recorded from 2003 to 2011. The prediction of new urban settlements was achieved using fractals and theory of chaos. More specifically, it was found that the urban growth is taken place within a Sierpinski carpet. Several shapes of Sierpinski carpets were tested in order to find the most appropriate, which produced an accuracy percentage of 70.6% for training set and 81.8% for validation set. This prediction method can be effectively applied in urban growth modelling, once cities are fractals and urban complexity can be successfully described through a Sierpinski tessellation.

KEYWORDS

Urban Growth Prediction; Fractals; Chaos Theory; Sierpinski Carpet; Pogonia

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