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Projection Pursuit Dynamic Cluster Model and its Application to Water Resources Carrying Capacity Evaluation

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ABSTRACT

The research shows that projection pursuit cluster (PPC) model is able to form a suitable index for overcoming the difficulties in comprehensive evaluation, which can be used to analyze complex multivariate problems. The PPC model is widely used in multifactor cluster and evaluation analysis, but there are a few problems needed to be solved in practice, such as cutoff radius parameter calibration. In this study, a new model-projection pursuit dynamic cluster (PPDC) model-based on projection pursuit principle is developed and used in water resources carrying capacity evaluation in China for the first time. In the PPDC model, there are two improvements compared with the PPC model, 1) a new projection index is constructed based on dynamic cluster principle, which avoids the problem of parameter calibration in the PPC model successfully; 2) the cluster results can be outputted directly according to the PPDC model, but the cluster results can be got based on the scatter points of projected characteristic values or the re-analysis for projected character-istic values in the PPC model. The results show that the PPDC model is a very effective and powerful tool in multifactor data exploratory analysis. It is a new method for water resources carrying capacity evaluation. The PPDC model and its application to water resources carrying capacity evaluation are introduced in detail in this paper.

KEYWORDS

Projection Pursuit, Dynamic Cluster, Genetic Algorithm, Water Resources

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