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Projection Pursuit Flood Disaster Classification Assessment Method Based on Multi-Swarm Cooperative Particle Swarm Optimization

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ABSTRACT

The indicators of flood damage assessment in the flood classification are often incompatible, and it is very difficult to use those indicators value directly for classification assessment. Projection pursuit technology can project higher dimensional incompatible data into lower dimensional sub-space, and find the projection values for optimal projection index function to get the higher dimensional data structure features, which has been improved to be reasonable and effective for flood disaster classification assessment. However, it is a bit difficult to optimize the parameters of projection index functions, as a result, that limits the applications of this method. As an emerging heuristic global optimization algorithm based on swarm intelligence, particle swarm optimization algorithm has the ability of solving complex optimization problem, but it still be easily convergent early, and can not search the global optimal solution. In this paper, a flood disaster classification assessment method based on multi-swarm cooperative particle swarm optimization is proposed, which adopts a tri-parameter Logistic curve to construct the flood disaster projection pursuit model, and uses mul-ti-swarm system particle swarm optimization method to optimize the parameters of the projection index functions. The typical test function experiment shows that this optimization method can solve the early convergence commonly found in standard particle swarm optimization algorithm, which global optimized ability is improved greatly. Applied in flood disaster assessment in HeNan Province, the results using this method comparing with others indicates that it can assess effectively the flood disaster, and has better assessment accuracy and disaster resolution.

KEYWORDS

Flood Classification, Particle Swarm Optimization, Projection Pursuit

Cite this paper

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