

Optimal fuzzy equivalent matrix-based fuzzy clustering method for hydrological station classification

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Abstract The research focus of fuzzy clustering method applications, such as hydrological station classification, is a distortion of the transitive closure method, and may cause the rough clustered result problem by direct clustering method based on original fuzzy similar matrix R produced from indexes values. For this reason, a computation problem of optimal fuzzy equivalent matrix Q of R was proposed to improve the matrix transitive degree and reduce distortion of R , an optimal scheme of Q was designed based on accelerating genetic algorithm, clustering results were obtained directly based on Q , and then an improved fuzzy clustering method (AGA-OFEM) was established. The research results show that classification results of AGA-OFEM are both reasonable with high precision, that AGA-OFEM is simple and effective, and that AGA-OFEM possesses important theoretical meaning and broad application value in different applications in systems engineering.

Key words fuzzy clustering; fuzzy equivalent matrix; genetic algorithm; hydrological station classification
