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基于打洞函数法的BP神经网络水文预报方法

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The BP Neural Network Hydrological Forecasting Algorithm Based on Tunneling Function Method

WANG Sheng-Gang, ZHANG Ying, XU Ying-Tao

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摘要 BP神经网络是目前水文预报中应用较为广泛的方法,但存在收敛速度慢、易陷入局部最优的缺陷.由此提出了基于全局优化打洞函数法的水文预报方法,把打洞函数法和BP神经网络相结合,利用打洞函数使BP算法跳出当前局部极小点,得到一个函数值更小的极小点,循环运算直至找到全局极小点.实验表明该水文预报方法能够提高预报精度,显示了良好的适用性.

关键词： 非线性规划　　水文预报　　打洞函数　BP神经网络

Abstract： BP neural network is widely used in hydrological forecasting. Aiming at the handicaps in present methods such as slow convergence and easily getting into local optimization, this paper presents a novel hydrological forecasting method based on the tunneling function which is one of the effective deterministic methods. The tunneling function method can find a lower minimizer by leaving the minimizer previously found. By repeating these processes, a global minimizer can be obtained at last. Experiments show the proposed method not only can obtain high accuracy in flood forecasting, but also has longer effective real-time. The hydrological forecasting method can be used in operational hydrological forecasting.

Keywords： nonlinear programming,　hydrological forecasting,　tunneling function,　BP neural network

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