

以類神經網路預測玉峰橋站高水位時期之流量

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摘要 集水區降雨-逕流具複雜之非線性關係，難以一般之概念模式或序率模式加以描述。本研究利用類神經網路中之幅狀基底函數網路 (RBFNN) 建構降雨 - 逕流模式，以推估濁水溪玉峰橋站於高水位時期下一小時及下二小時之流量。RBFNN 利用團塊法將雨量與流量進行分類，再利用線性迴歸來建構降雨-逕流之模式，因此修改後之 RBFNN 於前階段之訓練將採用非監督式學習，而後階段之訓練則採用監督式之學習，此法將可提高網路訓練速度。此外應用此修改過後之 RBFNN 只需決定一個參數，而網路架構及網路中之參數則可自動被決定。整體而言，類神經網路之預測能力優於傳統之模式，應用於玉峰橋流量預測之結果顯示，以類神經網路應用於洪水預報上應有相當之可行性。

關鍵詞：流量預測、高水位、類神經網路、降雨 - 逕流。

Use of the Neural Network to Predict Discharge During High Flow at The Yufong Bridge

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ABSTRACT The relation of rainfall and runoff in a catchment area is extremely complex and high nonlinear. It is always difficult to describe the hydrological processes by the concept of stochastic models. In this study, the radial basis function neural network (RBFNN) is used to construct a rainfall-runoff to predict the one-hour-ahead discharge and two-hour-ahead discharge of the Choshui River at the Yufong Bridge during high flow. The fuzzy min-max clustering method which is used to train the network at the first phase clusters the data of rainfall and runoff. Then, the linear regression is used to calibrate the parameters between the hidden layer and the output layer. The modified RBFNN can be trained by the hybrid learning algorithm. Thus, it speeds the training of the RBFNN. One of the advantages of the modified RBFNN is that only one parameter has to be selected. The network structure and parameters can be automatically determined by the training data.

Generally, neural network has a better forecasting ability than the concept or stochastic models. It is used to predict the discharge of the Yufong Bridge. The results show the potential use of the neural network to construct a flood forecasting model.