Estimation of Aquifer Transmissivity using Kriging, Artificial Neural Network, and Neuro-Fuzzy models

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Abstract

In interpolation of groundwater properties such as transmissivity, due to the unknown distributed values of the variables, heterogeneity, both the best and the unbiased aspects are frequently difficult to obtain. Therefore, applying a modern technique is necessary to obtain on a real estimation of transmissivity. To obtain the transmissivity values as an input data in groundwater modeling, the ordinary log kriging method has been usually used. In this study, the efficiency of the Adaptive Network based Fuzzy Inference System (*ANFIS*), artificial neural networks, and ordinary kriging are investigated in interpolation of transmissivity in an unconfined aquifer. The Results indicate that *ANFIS* model is more efficient to estimate the transmissivity in comparison with the *ANN* and kriging models. Results of this study reveal that the application of expert systems specially the hybrid types (*ANFIS* model) are more capable in estimation of spatial structure of groundwater transmissivity due to reflect the uncertainty and complexities which exist in variables nature.

Keywords: Transmissivity, Kriging, Aquifer, Artificial Neural Network, ANFIS.