Review of artificial neural network model for suspended sediment estimation

ABSTRACT

Prediction of sediment load are required in a wide spectrum of problem such as design of the dead volume of a dam, sediment transport in the river, design of stable channels, estimation of aggradation and degradation at bridge piers, prediction of sand and gravel mining effects on river-bed equilibrium, determination of the environmental impact assessment, and dredging needs. Generally, the sediment concentration in the river is related to water discharge. Researchers have been used the regression between sediment concentration and water discharge. Such relationships are obtained through the application of regression analysis in many studies. Unfortunately, in the classical regression approach to determine sediment concentration–water discharge relationships, internal uncertainties are not taken explicitly into consideration. However, this approach alone does not provide much physical meaning of the parameters used in the equations and does not improve understanding of sediment transport processes. It is important that the application of an equation derived mainly from the regression analysis of data should be limited similar conditions to those where the data were obtained. Recently because of these problems researcher looking for simpler, cheaper and easier methods to estimate sediment load and they begin to use nonlinear models like artificial neural network (ANN) technique to solve nonlinear problems. The neural networks approach has been applied to many branches of science. This approach is becoming a strong tool for providing civil and environmental engineers with sufficient details for design purposes and management practices. M otivated by successful applications in modelling nonlinear system behaviour in a wide range of areas, ANNs have been applied in hydrology and hydraulics. The main purpose of this paper is literature review of Artificial Neural Network for suspended sediment estimation.

Keyword: Artificial neural network; Suspended sediment; Model