

Natural Rivers Longitudinal Dispersion Coefficient Simulation Using Hybrid Soft Computing Model

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Abstract

The determination of longitudinal dispersion coefficient (LDC) of pollutants in stream contributes to several environmental and hydraulic engineering practices. Hence, providing an accurate and reliable methodology for predicting LDC is an essential process required water resources engineers. In this research, new hybrid soft computing model called deep neural network (DNN) coupled with genetic algorithm (GA), is developed to predict LDC using historical information attained from published researches in the literature. The GA is established as an evolutionary modeling phase to define the highly influencing hydraulic variables as an input combination attributes to compute the LDC. The hydraulic variables belonged to various stream all around the world, are utilized to build the modeling structure. The developed prediction model assessed using various statistical metrics to visualize its predictability. The proposed coupled predictive model validated with the core established research on the same application. In general, the model exhibited an excellent methodology for the environmental and hydraulic engineering aspects. Most importantly, the proposed model fulfilled the contribution of river engineering sustainability.