

ABSTRACT:

Owing to the complexity of the hydrological process, Backpropagation Neural Network (BPNN) is the single superior model that is able to calibrate the rainfall-runoff relationship accurately using only rainfall and runoff data. However, BPNN convergence rate is relatively slow and being trapped at the local minima. Therefore, a new evolutionary algorithm (EA) namely Particle swarm optimization (PSO) is proposed to train the feedforward neural network. This Particle Swarm Optimization Feedforward Neural Network (PSONN) is applied to model the hourly rainfall-runoff relationship for Bedup Basin. With the input data of current rainfall, antecedent rainfall, antecedent runoff, the optimal configuration of PSONN successfully simulate current runoff accurately with $R=0.975$ and $E2=0.9605$ for training data set and $R=0.947$ and $E2=0.9461$ for testing data set. Meanwhile, PSONN also proved its ability to predict the runoff accurately at the lead- time of 3, 6, 9 and 12-hour ahead.