Modeling Aeration of Sharp Crested Weirs by Using Support Vector Machines

Authors : Arun Goel

Abstract : The present paper attempts to investigate the prediction of air entrainment rate and aeration efficiency of a free over-fall jets issuing from a triangular sharp crested weir by using regression based modelling. The empirical equations, support vector machine (polynomial and radial basis function) models and the linear regression techniques were applied on the triangular sharp crested weirs relating the air entrainment rate and the aeration efficiency to the input parameters namely drop height, discharge, and vertex angle. It was observed that there exists a good agreement between the measured values and the values obtained using empirical equations, support vector machine (Polynomial and rbf) models, and the linear regression techniques. The test results demonstrated that the SVM based (Poly & rbf) model also provided acceptable prediction of the measured values with reasonable accuracy along with empirical equations and linear regression techniques in modelling the air entrainment rate and the aeration efficiency of a free over-fall jets issuing from triangular sharp crested weir. Further sensitivity analysis has also been performed to study the impact of input parameter on the output in terms of air entrainment rate and aeration efficiency.