

عنوان مقاله:

Comparison of Three Soft Computing Methods in Estimating Apparent Shear Stress in Compound Channels

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خلاصه مقاله:

Apparent shear stress acting on a vertical interface between the main channel and floodplain in a compound channel serves to quantify the momentum transfer between sub sections of this crosssection. In this study, three soft computing methods are used to simulate apparent shear stress in prismatic compound channels. The Genetic Algorithm Artificial neural network (GAA), Genetic Programming (GP) and Modified Structure-Multi Layer Perceptron (MS-MLP) are applied to about 100 different data to predict apparent shear stress. The modelling procedure with three models were extended and the best of each model was selected after each step. In modeling with the GAA and GP different input combinations, fitness functions, transfer functions and mathematical functions were investigated for obtaining the optimum combination. The results showed B/b, H/B, n_f/n_c and h/b as input combination, fitness function MSE and transfer function tan-pur is the best combination for GAA model. The best GP model introduced with B/b, $(H-h)/h$, n_f/n_c and h/b as input variables, fitness function MAE and $\sin, \cos, \text{abs}, \text{sqrt}, \text{power}$ as the mathematical function set. Finally, the most appropriate GAA, GP and MS-MLP models were compared to select the best of them in estimating apparent shear stress in compound channels. According to the results, MS-MLP improved with RMSE of 0.3654 over GAA with RMSE of 0.5326 and the GP method with RMSE of 0.6615.

کلمات کلیدی:

Apparent Shear Stress, Multi Layer Perceptron, Radial Basis Function, Genetic Programming, Genetic Algorithm, Artificial Neural Network, Decision Tree, Symmetric Compound Channel

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