

ABOUT THE USE OF ARTIFICIAL NEURAL NETWORKS FOR STREAM FLOW PREDICTIONS

R. Gosset (1) and **E. Gaume** (1)

(1) CEREVERE-ENPC, 6/8 Avenue Blaise Pascal, Cite Descartes - Champs sur Marne - 77455 Marne la Vallee.

`gaume@cereve.enpc.fr`

Among the models available for stream flow forecasting, Feed Forward Artificial Neural Networks have been gaining interest in the last few years. But, despite the promising results presented in recent papers, their use for stream flow prediction is questionable. In fact, their “universal approximator” property guarantees, if a sufficient number of neurons is selected, good performances of the model for interpolation purposes. But a complex model does not ensure a better predicting power. Models with many parameters have a high probability to fit the noise and the particularities of the calibration dataset, and so loosing their generalization capacities. In this study, we used a simple method to determine the optimal number of neurons in the network. This method was applied to two different cases : river flow prediction based on the knowledge of upstream flows, and rainfall-runoff modeling. The predictive power of the selected neural networks was compared to the results obtained with linear models and a conceptual model. In both case studies, the method used leads to the choice of an ANN with a limited number of hidden neurons. Moreover, the behaviors of the FNN and the linear model are very close. The conceptual model, specifically dedicated to rainfall-runoff modeling, appears to outperform the two other approaches.