



Applying a Genetic Programming Approach to River Flow Forecasting

A.Y. Shamseldin (1), R.J. Abrahart (2), L.M. See (3), and C.W. Dawson (4)

(1) Department of Civil and Environmental Engineering, The University of Auckland, Auckland, New Zealand (a.shamseldin@auckland.ac.nz), (2) School of Geography, University of Nottingham, Nottingham, United Kingdom, (3) School of Geography, University of Leeds, Leeds, United Kingdom, (4) Department of Computer Science, Loughborough University, Loughborough, United Kingdom

This paper explores the use of Genetic Programming (GP) for river flow forecasting in two contrasting catchments in different parts of the world. GP is a data-driven non-parametric approach that is powerful in modelling input-output relationships without making any a priori assumptions about the relationship. GP is based on the principles of evolution and essentially allows equations to be bred from a series of input variables and operators. The two contrasting catchments and their points of forecast are: (i) the River Brosna, at Ferbane, in the Republic of Ireland; and (ii) the Upper Han River, at Shiquan, in east-central China. The daily rainfall and the previous observed discharge are used as inputs to the GP model to produce the river flow forecasts for a 1-day lead time. The results of the GP model are compared to those of a traditional linear transfer model. The results indicate that the GP model has considerable promise in river flow forecasting.