XVIII International Conference on Water Resources
CMWR 2010
J. Carrera (Ed)
CIMNE, Barcelona 2010

A NOVEL GENETIC PROGRAMMING HEURISTIC SUPPORTED ON GENETIC ALGORITHMS AND AVERAGE MUTUAL INFORMATION AS FITNESS EVALUATION METRIC – SOME APPLICATIONS FROM HYDRAULICS –

Jaime A. Moreno[*], Eder G. Cárdenas[*] and Nelson Obregón[†]

[*] Pontificia Universidad Javeriana (PUJ)
Cra. 7 40 - 62, Bogotá, Colombia
e-mail: moreno-jaime@javeriana.edu.co, eder.cardenas@javeriana.edu.co, web page: http://www.javeriana.edu.co

[†] Instituto Geofísico Pontificia Universidad Javeriana (PUJ)
Lorenzo Uribe Building Cra. 7 42-27 floors 5 and 7, Bogotá, Colombia
e-mail: nobregon@javeriana.edu.co, web page: http://www.javeriana.edu.co

Summary. All models aim to represent the reality of a process within the most incident variables as faithfully and easily as possible. In this order, it has developed a new genetic programming heuristic that contributes to find mathematical models that include the main variables and their relationships. This novel approach uses the average mutual information (AMI) as evaluation metric and incorporates Genetic Algorithms (GA) to find the optimal set of parameters.

Two controlled experiments were made to assess the heuristic's behavior, they consisted in getting back to the Manning equation and Hallermeier equation from simulated data. Finally, it's shown how the algorithm achieves to recover the equations.