



## **An analysis of multi-reservoir operation using multi-objective optimization algorithms**

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The main target of the study is to analyze the river basin management decision support systems (DSS) with the state of the art mathematical algorithms that represent optimal water management. A model has been built in MODSIM software in the program “OPTIMIZATION TECHNIQUES FOR THE MANAGEMENT OF WATER RESOURCES AND THEIR SURROUNDINGS IN BOGOTA“. A Lagrangian optimization with a combination of expert knowledge has been used to determine the optimal operation rules for the reservoirs. The study presented here makes a comparative analysis of the operation in terms of integrated water management in the Chingaza system in Bogotá, Colombia. The procedure is based on evaluating the deviation between the mean monthly water reservoir levels used in operation of three connected river basins and the relative optimal value of the mean for operation. Three objectives are defined to minimize the water supply cost, maximize the power generation profit and maximize the production of vegetables. Parameters required for quantifying efficiency of irrigation and water supply are determined with expert knowledge. The model was solved by non-dominated sorting Genetic Algorithm II (NSGA-II). The results show that with this procedure it is possible to validate the operation rules of multiple reservoirs and multiple operation rules in terms of economical and environmental variables.