Multi-objective Optimization with NSGA II Algorithm for Water Distribution Management System

U. H. R Kumari[1(*)], K. P. N. Jayasena[1]

[1]*Department of Computing and Information Systems, Sabaragamuwa University of Sri Lanka*

[(*)] Email: uhrkumari@std.appsc.sab.ac.lk

Water distribution systems are water resources that provide consumers with water from the source. The water distribution system includes elements, such as valves, pipes, pumps, tanks and reservoirs and is important in urban development. Today the water distribution systems are very complex. Moreover,massive investments are needed to implement and maintain them. Mitigation of these problems requires the development of a system that reduces its cost and complexity.This research isfocused on the observation of the water usage distributed through the water board. The main objectives of this research are to develop an optimized water distribution system design using multi-objective optimization concept and to find a smart solution for the management of the water distribution system. The implementation for this problem would be formulated through Non-Dominated Sorting Genetic Algorithm (NSGA)-II. The proposed NSGA-II, in most problems, is able to find much better spread of solutions and better convergence near the true Pareto-optimal front compared to Pareto-archived evolution strategy. This system imitates the network and evaluate the tank pressure, piece and power under the proposed schedule. The outcome of this system is elaborated as the interpretation of the optimal pressure level, tank volume, fragmentation and energy level for the given instances. In future we plan to implement NSGA II and compare with another multi-objective algorithm.

Keywords: NSGA II, multi-objective optimization, water distribution systems