Developing New Algorithm and Its Application on Optimal Control of Pumps in Water Distribution Network

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Abstract : In recent years, new techniques for solving complex problems in engineering are proposed. One of these techniques is JPSO algorithm. With innovative changes in the nature of the jump algorithm JPSO, it is possible to construct a graph-based solution with a new algorithm called G-JPSO. In this paper, a new algorithm to solve the optimal control problem Fletcher-Powell and optimal control of pumps in water distribution network was evaluated. Optimal control of pumps comprise of optimum timetable operation (status on and off) for each of the pumps at the desired time interval. Maximum number of status on and off for each pumps imposed to the objective function as another constraint. To determine the optimal operation of pumps, a model-based optimization-simulation algorithm was developed based on G-JPSO and JPSO algorithms. The proposed algorithm results were compared well with the ant colony algorithm, genetic and JPSO results. This shows the robustness of proposed algorithm in finding near optimum solutions with reasonable computational cost.

Keywords : G-JPSO, operation, optimization, pumping station, water distribution networks

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