Abstract

The high cost problem of urban water supply systems, along with the complexity of the design and unsuitable operation problems cause that Optimization of the system before applying any changes, has become the basic needs of managers in this area. Due to the complexity of nonlinear and unique design of these networks, in recent years engineers using artificial intelligence and search algorithms to solve this problem. In the present study find solutions for the network in a town of Kerman with help of Genetic Algorithms, Imperialist competitive algorithm and fireflies and network simulation software intended WaterGEMS. First the water supply network in the study area simulated in WaterGEMS model and the properties required for optimization algorithms have been extract, then Using the standard pressure and speed constraints, these algorithms create optimal choices. By entering these results in WaterGEMS model and re-running for limits check, the cost estimates are discussed and compared. The results show that the optimization of Imperialist competitive algorithm with 37.4% and Genetic algorithm with very little difference (0.4%) means 37.7% is able to reduce the cost function of network compare to pre-optimized network. also Fireflies algorithm in the amount of 34.4%, is able to reduce costs. Finally, we can say that all optimization algorithms used in this study have been able to achieve a dramatic reduction in project costs.

Key words: Firefly algorithm, water network, genetic algorithm, optimization, Imperialist competitive algorithm, WaterGEMS.

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Optimization of Water Network Distribution Using Genetic Algorithm and Relopt Model (Case Study: Havanirouz Town, Kerman)

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