Abstract

An irrigation system is a hydraulic infrastructure that conveys water from the source to the consumers. The aim of the irrigation network design is to find the optimal pipe diameter for each pipe in the network for a given layout, demand loading conditions, and an operation policy. In this paper, we propose a model that uses Genetic Algorithm as an optimization scheme and link this algorithm with Epanet network solver to identify the least cost of pipes used in irrigation systems. Genetic Algorithm, being evolutionary, identifies the pipe diameters in a way that the total cost of the network so obtained, will be minimum. Our model selects the optimal pipe sizes in the final network satisfying all implicit constraints (e. g. conservations of mass and energy), and explicit constraints (e. g. pressure head and design constraints). The hydraulic constraints, deal with hydraulic head at certain nodes to meet a specified minimum value. If the hydraulic head constraint is violated, the penalty cost is added to the network cost.

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Index Terms

Computer Science

Algorithms
Keywords
irrigation  Genetic Algorithm  Epanet  optimization  Network cost  penalty cost