

Optimal dimensioning model of water distribution systems

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Abstract

This study is aimed at developing a pipe-sizing model for a water distribution system. The optimal solution minimises the system's total cost, which comprises the hydraulic network capital cost, plus the capitalised cost of pumping energy. The developed model, called Lenhsnet, may also be used for economical design when expanding existing hydraulic networks. The methodology developed includes an iterative dynamic calculation process as well as a hydraulic simulation model. The performance of the method is tested against 4 benchmark examples in the literature. The results obtained show the feasibility of this model, presenting it as a viable alternative for water distribution systems. The method is easily used, once it is performed under EPANET2 software interface.

Keywords: pipe-sizing model, economic optimisation, energy