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Effect of Utility Function Curvature of Young's Bargaining Method on the Design of WDNs

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Abstract The optimal design of a water distribution network is a simulation-optimization task that should consider conflicts between different groups of stakeholders directly or indirectly. Investors and consumers are two groups of stakeholders with conflicting goals. Young's bargaining method is a decision tool based on game theory that can help decision-makers to select one of the design alternatives by considering utilities of stakeholders. In this paper, the optimal design of two benchmark network problems (Two-loop and Hanoi networks) is considered with minimization of design cost and maximization of system efficiency, with respect to increasing hydraulic pressure. In this regard, decision alternatives are first determined by using a multi-objective, fast, messy genetic algorithm (MOFMGA).

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