Demand Pattern Calibration of Extended Water Supply Networks

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ABSTRACT

Parameter uncertainties are a major concern when dealing with models of large water supply networks (WSNs), especially when it comes to demand magnitude and its distribution through the network. Great part of the uncertainty is related to the lack of continuous monitoring at consumption points. Sometimes, big companies rely only on annual information of users' consumption and/or flow/pressure measured in the sources. This makes it difficult the representation of the temporal (both seasonal and daily) variation, as well as the geographical variations in consumption that are expected in any city. Specifically, when only the information of the sources is used to establish the demand pattern of a big area, the final result is a general demand pattern that does not reflect the consumption dynamics of specific areas. This, in turn, affects the calibration of the mathematical model. Based on this idea, it can be established that in big cities it is paramount to consider some features of the demand patterns within the scope of smarter network calibration. This aspect has been previously addressed, among others, in[1], through a mathematical technique called single value decomposition, or in [2], through a heuristic approach that uses a bio-inspired algorithm. In this work we address a real-world problem, and try to adjust the demand pattern of different areas of the city of Berlin, Germany. To tackle the problem we propose a combination of a clustering technique with a heuristic bio-inspired optimization algorithm. This work presents preliminary results of our investigation.

REFERENCES

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