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Optimal Sensor Placement with Mitigation Strategy for Water Network Systems under Uncertainty

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Highlights:

1. Sensor placement in drinking water networks
2. New objective function describing impact
3. Large scale problem with EPANET-MSX simulator
4. Solution of Stochastic mixed integer nonlinear programming problem
5. Novel mitigation strategy based on warning information to public about contamination
6. Comparing three previous approaches to the new approach.

Abstract:

Contamination of water in a distributed water network can cause serious public health disaster. The contamination can occur at one part of the network and may spread to different region depending of the flow pattern of water. It is essential to monitor contamination using distributed water networks and a practical way to do so, is through the application of sensor networks. Sensors are used for timely detection of the presence of various contaminants in water. To accurately and optimally map the contamination distribution, it is quintessential to place sensors in optimal positions in the network whereby the goal is to minimize the net effect