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Drinking Water Engineering and Science Discussions

Interactive comment on "Robust optimization methodologies for water supply systems design" *by* J. Marques et al.

Anonymous Referee #1

Received and published: 6 June 2012

General comments:

This paper presents an interesting research on designing a robust water supply system using alternative methods. This paper presents novel ideas that address relevant scientific questions within the scope of DWES. This paper is generally well written. The authors give proper credit to related work and their contribution is clearly indicated. The content of the references are relevant. The number and quality of the reference are appropriate. This reviewer recommends the paper to be published in DWES after addressing the following comments.

Specific comments:

1) The Robust Model section includes a lot of equations with a lot of decision variables.

This reviewer understands that the authors explained them all at the end of the section. But it might be clear to separate some of the equations into small groups, which will be easier for readers to follow. For example, the authors listed all of the constraints considered together. It might be better to separate the decision variables and constraints due to the formulation of the optimization problems from those ones due to the use of the optimization algorithm, such as YDd,i and Eq. (7).

2) Two minimum pressures are used in this study, which results in two different ways of penalizing a solution with constraint violation. However, it is not clear to this reviewer how these two different constraint violations are penalized. Especially for the first one, the authors only mentioned “the objective function is penalized”.

3) Can the authors please explain why a minimum diameter for the pipes is used? Why not let the optimization algorithm to determine whether or not a smaller pipe diameter is required?

4) Can the authors please explain why two different maximum pressures are used? Is this realistic, considering the maximum pressure constraint is normally used to avoid damage to equipment or domestic appliances linked to the network?

5) In the second case, a pump is used. Can the authors please explain what type of pump is used (e.g. fixed speed pump or variable speed pump) and how it is sized in the problem?

6) For all of the solutions presented, there are some kind of constraint violations associated with them. Can the authors please explain why for both cases no feasible solutions without any constraint violation are found? Is this because the optimization has not converged?

Minor comments:

1) Please capitalize “table” in Line 1 Page 6, Line 2 Page6, Line 1 Page 8.

2) Please use "Eq." when referring to equations in the second paragraph on Page 5,

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so it is consistent throughout the paper.

Interactive comment on Drink. Water Eng. Sci. Discuss., 5, 173, 2012.