

## ***Interactive comment on “Algorithms for Optimization of Branching Gravity-Driven Water Networks” by Ian Dardani and Gerard F. Jones***

**Anonymous Referee #2**

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1. The manuscript presents algorithms for optimization of branching gravity-driven water networks, which is interesting. The subject addressed is within the scope of the journal. 2. However, the manuscript, in its present form, contains several weaknesses. Appropriate revisions to the following points should be undertaken in order to justify recommendation for publication. 3. Full names should be shown for all abbreviations in their first occurrence in texts. For example, PVC in p.1, D in p.3, WDN in p.4, HGL in p.12, etc. 4. For readers to quickly catch your contribution, it would be better to highlight major difficulties and challenges, and your original achievements to overcome them, in a clearer way in abstract and introduction. 5. It is mentioned in p.1 that three cost-minimization algorithms are adopted for the design of moderate-scale branching Gravity-Driven Water Networks. What are the other feasible alternatives? What are the advantages of adopting these particular algorithms over others in this case? How will

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this affect the results? More details should be furnished. 6. It is mentioned in p.4 that five actual GDWNs installed in Panama, Nicaragua, and the Philippines are adopted as test cases. What are the other feasible alternatives? What are the advantages of adopting these particular test cases over others in this case? How will this affect the results? More details should be furnished. 7. It is mentioned in p.5 that “. . .The pressure upper bound is not incorporated into the optimization process. . .” Why this is not incorporated? More justifications should be furnished on this. 8. It is mentioned in p.5 that “. . .precautions against water hammer are left to the designer. . .” Why this is left to the designer? More justifications should be furnished on this. 9. It is mentioned in p.7 that a two-part model is adopted in this study. What are the other feasible alternatives? What are the advantages of adopting this particular model over others in this case? How will this affect the results? More details should be furnished. 10. It is mentioned in p.9 that a cubic spline is adopted to complete the transition between small and large pipe sizes. What are the other feasible alternatives? What are the advantages of adopting this particular function over others in this case? How will this affect the results? More details should be furnished. 11. It is mentioned in p.13 that two rejection criteria are adopted to reduce the number of solutions to be evaluated. What are the other feasible alternatives? What are the advantages of adopting these particular criteria over others in this case? How will this affect the results? More details should be furnished. 12. It is mentioned in p.14 that the method presented by González-Cebollada et al. (2011) is adopted as the BT algorithm. What are the other feasible alternatives? What are the advantages of adopting this particular method over others in this case? How will this affect the results? More details should be furnished. 13. It is mentioned in p.15 that a single-point crossover is adopted in this study. What are the other feasible alternatives? What are the advantages of adopting this particular crossover method over others in this case? How will this affect the results? More details should be furnished. 14. It is mentioned in p.15 that a pinwheel lottery (with replacement) is adopted to select candidates to be carried into the next generation. What are the other feasible alternatives? What are the advantages of adopting this particular approach over others in this case?

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How will this affect the results? More details should be furnished. 15. It is mentioned in p.18 that "...and several of these would likely improve upon the GA results obtained in this study ...". Why they are not performed in this study? More justifications should be furnished on this. 16. Some key parameters are not mentioned. The rationale on the choice of the particular set of parameters should be explained with more details. Have the authors experimented with other sets of values? What are the sensitivities of these parameters on the results? 17. Some assumptions are stated in various sections. Justifications should be provided on these assumptions. Evaluation on how they will affect the results should be made. 18. The discussion section in the present form is relatively weak and should be strengthened with more details and justifications. 19. Moreover, the manuscript could be substantially improved by relying and citing more on recent literatures about real-life case studies of contemporary soft computing techniques in water resources engineering such as the followings: ĩAñ Gholami, V., et al., "Modeling of groundwater level fluctuations using dendrochronology in alluvial aquifers", *Journal of Hydrology* 529 (3): 1060-1069 2015. ĩAñ Taormina, R., et al., "Data-driven input variable selection for rainfall-runoff modeling using binary-coded particle swarm optimization and Extreme Learning Machines", *Journal of Hydrology* 529 (3): 1617-1632 2015. ĩAñ Wu, C.L., et al., "Methods to improve neural network performance in daily flows prediction," *Journal of Hydrology* 372 (1-4): 80-93 2009. ĩAñ Wang, W.C., et al., "Improving forecasting accuracy of annual runoff time series using ARIMA based on EEMD decomposition," *Water Resources Management* 29 (8): 2655-2675 2015. ĩAñ Chen, X.Y., et al., "A Novel Hybrid Neural Network based on Continuity Equation and Fuzzy Pattern-recognition for Downstream Daily River Discharge Forecasting," *Journal of Hydroinformatics* 17 (5): 733-744 2015. ĩAñ Saeidifarzad, B., et al., "Multi-site calibration of linear reservoir based geomorphologic rainfall-runoff models", *Water* 6 (9): 2690-2716 2014. 20. In the conclusion section, the limitations of this study, suggested improvements of this work and future directions should be highlighted.

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