Interactive comment on "Technical note: Problem specific variators in a genetic algorithm for the optimization of drinking water networks" *by* Karel van Laarhoven et al.

Anonymous Referee #2

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Authors present a set of different genetic operators that may improve the behaviour of the algorithm in terms of convergence and repetitiveness. The paper begins with a fast review of the state of the art, stating the areas where these algorithms might be improved. Then, authors present the variations they proposed for the different genetic operators. Finally, a set of simulations were done to test the performance of the operators. In this sense, the paper can improved the standard use of Genetic Algorithm in the field of the design of water networks. There are some minor comments that could be mentioned:

a) Authors propose the use of two heuristic variations for mutation operator: flatiron

and proximity. A doubt exists about their authorship. Do the authors propose these operators? Are they adapted from previous works? In the first case, the operators should be described with more detail. On the contrary, if the operators were taken from other authors, their work should be referenced.

b) Proximity operator use values of a number of neighbours. The concept of neighbour in water system is a topological one. Topological operations might be computational heavy and time to reach a solution might increase. Some comment about this fact could be said.

c) Authors made a set of tests with "[. . .] 1x10ˆ5 function evaluation [. . .]". Later, in Figure 4 up to 1000 generations are represented. It can be deduced that the population used for the algorithm is 100 individuals. However, since Genetic Algorithm is strongly based on population, the population must be explicitly mentioned in the paper.

Apart from the previous comments, other little changes could help improving the paper:

- In line 1-2, page 2, the year of publication for El-Mihoub et al. (2006) might be added.

- In line 13, page 2, there is a mistake: "[. . .] to construct an model [. . .]" should be changed by "[. . .] to construct a model [. . .]"

- All references to the number of function evaluations (1x105) or fitness values (8.8x105) should be written with superscript or using the "ˆ" symbol. This affects to lines 12, 22, 24 and 29 in page 3; and lines 9 and 12 in page 4.

- In line 6, page 3 there is a word missing: "[. . .] 584 nodes, 491 ? and 1 reservoir [. . .]". I guess the word links or pipes is missing. Anyway, please check this number since a network with 584 nodes and (only) 491 links cannot be run with EPANET. If this check is performed, Figure 4 caption should also be corrected.

- In line 2, page 4 the test 2 is referred to as RM-NPC2. However, in Figure 2 is referred to as RMNPC2 and in Figure 4 is referred to simply as test 2. Please use the same reference throughout the paper.

- Caption for Figure 4 refers part (a) as results corresponding to test 2 and part (b) as results for test 12. However, the part (a) has a value for the objective function between 5.2e5 and 7.3e5 (coherent with the results of test 12, 5.63e5). It happens the same with part (b), values close to 9e5, more likely to correspond to test 2, 8.8e5. Probably it is just a question of flipping the caption for parts (a) and (b).

- (This is only my personal point of view. Please forget if you disagree). In scientific texts, it is recommended to use a non-personal language. For that reason I encourage the authors to change the personal style in line 22, page 1 ("[. . .] In this paper, we [. . .]") and line 13, page 4 ("[. . .] consulting projects, we will [. . .]").