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Drinking Water
Engineering and Science
Discussions

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 #1

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The authors have done a fairly extensive study of genetic algorithm operators for a drinking water network optimization problem. This is important work, especially as optimization of this type becomes more prevalent in engineering practice. I found the paper to be well written and concise, but a few minor issues should be addressed:

1. page 1, line 16 - "A widely applied approach is that of Genetic Algorithms..." the authors should cite the Maier et al (2014) study here (references to it do appear later in the paper). This Maier paper is a thorough review of the state of the field, so it can be used to contextualize the work. In fact, I would say that modern terminology calls these approaches "evolutionary algorithms", of which the generic Genetic Algorithm is

simply one approach.

2. page 1, line 18 - If the authors are referring to "tricks" they should cite a few examples. Otherwise, the authors are giving the false impression that they are the first to explore these genetic algorithm parameters, which I do not believe they are.

3. page 2 - In this list, I think it is important to mention the fact that some of these evolutionary algorithm techniques are not genetic algorithms at all, but rather other algorithms such as differential evolution. THat could perhaps be a sixth item in the list.

4. section "Problem specific variators" - I was somewhat confused by this section, since in it the authors have discussed some of the new operators they are looking at, but it seemed to overlap with the subsequent "Tests" section. I think the organization of these methods sections could use some fixing.

5. A citation for EPANET should be given, and if the model is freely available, that should be noted.

6. page 3, line 12 - The authors have consistently forgotten the formatting of 10^5; this should be fixed throughout.

7. A brief mention of how the optimization was carried out would be appropriate, especially in the population size. The population size has been shown to be a very important parameter for assessing GA success.

8. The "Tests" section should also briefly comment on the performance criterion used (namely, the best optimal solution found so far as a function of time during the run)

9. The authors should give some general guidance as to how to assess the "significance" of the objective function value. For example, other than the drastic reduction in objective of the first three tests as compared to the last three, is there a difference? In other words, it appears as though the first three tests are the worst, but can we tell the difference with the other 9 tests?

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