Title: Optimum Water Quality Monitoring Network Design for Bidirectional River Systems Using Modified MOPSO
Authors: Xiaohui Zhu, Yong Yue, Prudence W. H. Wong, and Yixin Zhang

This paper proposes a method to find the optimal locations of monitoring devices for designing water quality monitoring network and shows numerical results when applying the method to a hypothetical river. Handling bidirectional flow is somewhat interesting, but for the publication it should be intensively refined especially with respect to showing the effectiveness of their optimization algorithm. Also some issues regarding their test problem also came out, and thus, I am recommending a major revision. My specific comments are as follows:

Main Comments

1) (Effectiveness of MOPSO) Particle Swarm Optimization (PSO) is often used for optimization with continuous variables. Even though authors apply a simple and traditional way (just rounding up and down) to change continuous values to discretized values, there is no specific reason why PSO works better than other algorithms, for example Genetic Algorithm (Pratap et al. 2002) or Nested Partitions algorithm (Shi and Ólafsson 2000). Especially, this problem includes categorical type variables (i.e., two adjacent solutions may not have any functional relationship) and thus I am still wondering why authors have tried to adjust PSO to solve this problem and how their algorithm outperforms the existing algorithm.

2) (Problem Formulation) Unless authors assume that each monitoring device should be discriminated, they should exclude repetition of solutions (e.g., (2,3,1) is the same as (1,2,3)). Without repetition, total number of potential deployment is $\binom{m}{n}$, not equation (1) in page 5. Also, authors mentioned that they will deploy 20 monitoring devices within 100 potential locations, readers cannot see any such example in the paper.

3) (Test Problem) In order to test the performance of their algorithm, they consider a hypothetical river with only 12 nodes (possible locations for monitoring stations). When selecting three locations out of 12 possible locations, there are only $\binom{12}{3} = 220$ potential cases. Thus, no optimization algorithm is needed to solve the problem (i.e., we can evaluate all possible cases easily). Unless authors apply their algorithm to a larger and more realistic case, such as Altamaha River case in Telci. et al. (2009), I believe it is hard to show the effectiveness of the algorithm in a practical point of view.

Reference

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Shi, L., & Ólafsson, S. (2000). Nested partitions method for global optimization. Operations research, 48(3), 390-407.
Telci, I. T., Nam, K., Guan, J., & Aral, M. M. (2009). Optimal water quality monitoring network design for river systems. Journal of environmental management, 90(10), 2987-2998.