

**Interactive comment on “A novel framework of deriving joint impoundment rules for large-scale reservoir system based on a classification-aggregation-decomposition approach” by Shaokun He et al.**

Anonymous Referee #2

Received and published: 30 April 2020

The presented research, in my opinion, well fits the scope of the HESS and could be an important contribution to the management of large scale multi-objective reservoirs. In their very interesting paper, the authors presented a novel methodology that integrates the ‘classification-aggregation-decomposition’ and the Parallel Progressive Optimization Algorithm method to conquer the ‘curse of dimensionality’ problem of complex 30-reservoir impoundment operation. The idea of deriving a systematic optimization framework for an entire basin by taking into account multi-purposes all 30-reservoir is very attractive and ambitious. However, the current form of the manuscript possesses several shortcomings which should be revised to improve its readability and quality.

Reply: Thanks for your careful review and positive evaluation of our work. We will revise the paper following your professional advices and suggestions. In the following, we provide point-by-point responses to your concerns and how we should address them in the revision.

(1) It is very hard annoying to review a paper where the figures are put at the end of the manuscript. It would be easier to review the manuscript if figures are as close as possible to the place in the text (and not upside down) where they are being referenced.

Reply: In the revised version, we will put the figures in the text where they are referred

to.

(2) The methodology does not well present, especially fails to emphasize the function of the PPOA method in the framework. The authors should add more detailed information about PPOA to make it clear and informative. Fig 3 could be revised to explicitly show the four main steps involved in the proposed framework.

Reply: Thanks for your professional comments, we will emphasize the use of *PPOA* in the revision, especially Fig. 3, the flowchart of our methodology. In the revised version, Fig. 3. will read like the following:

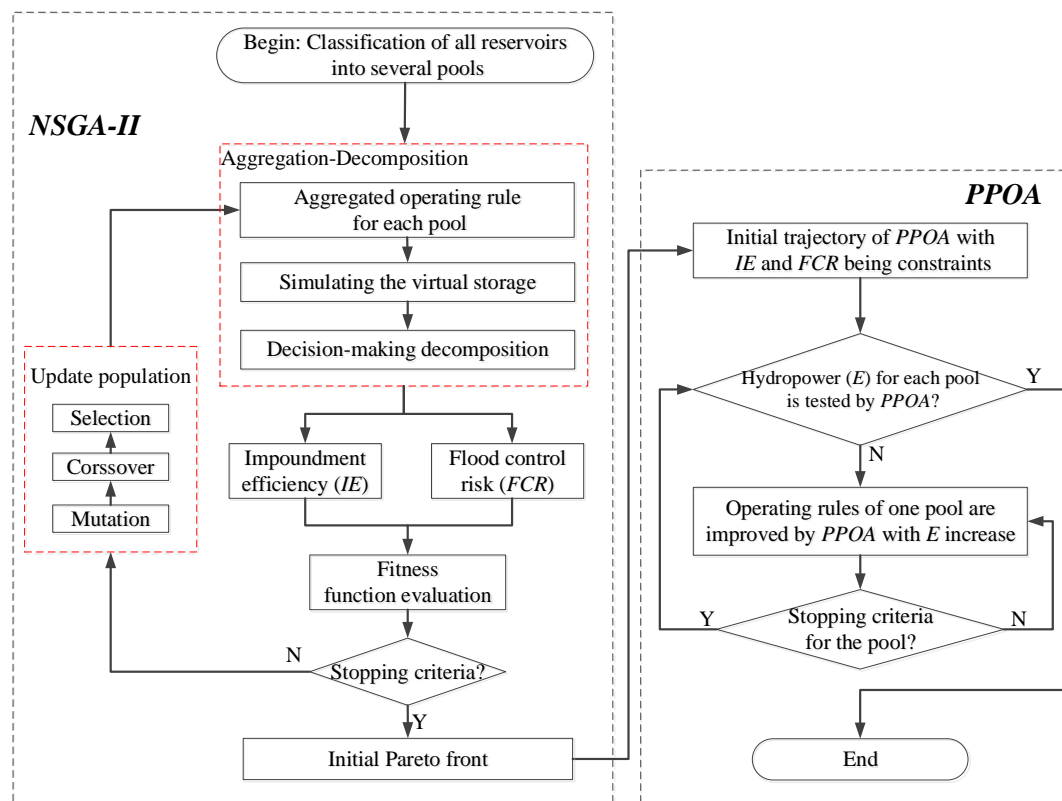


Fig. 3 The framework of the large-scale reservoir impoundment system for policy optimization.

(3) The schematic diagram of the PPOA algorithm in Fig 5 should be better drawing.

Reply: Thanks for your comments, we will re-design this figure in the revision as follows.

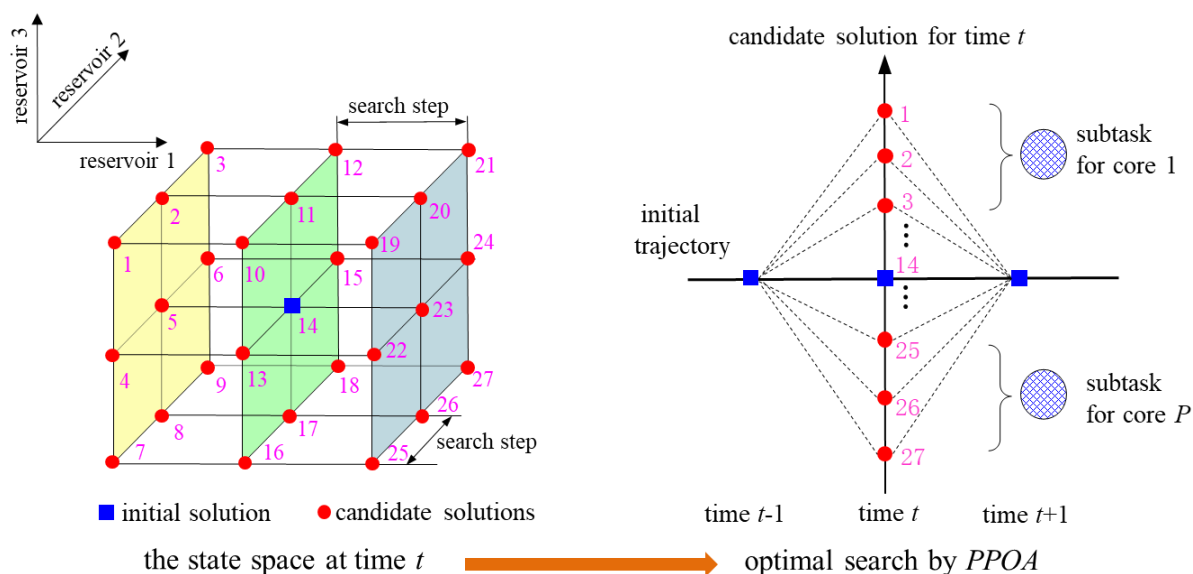


Fig. 5 Sketch map of the *PPOA* algorithm for solution improvement at time  $t$ .

(4) The comparison results of three optimal operating rules with the Conventional Operating Rule, in my opinion, seem tedious (for example, Figure 7), and a long explanation of Section 4.3 is not necessary.

Reply: Thanks for your comments, we will streamline the comparison of different rules, as well as the description of Section 4.3 in the revised paper.

(5) Fig. 10, “Hydropower increment of seven pools for three policies compared to the COR in different streamflow scenarios”, should be re-design and/or changed colors and make it more attractive and informative.

Reply: Many thanks for your advice. We will re-design this figure in the revision to emphasize the result of the most optimal policy. Also, the figure color will be changed to be more attractive as follows.

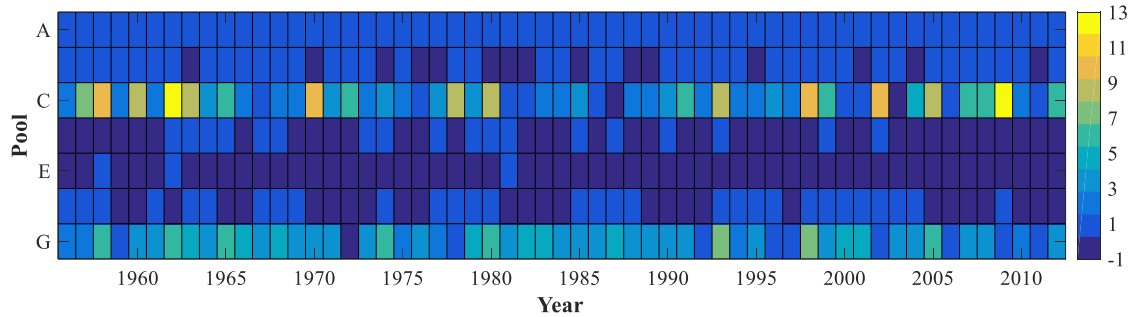


Fig. 10 Annual hydropower increment of seven pools (A-G) for the most optimal policy with *COR* (Unit: billion kWh).

(6) Some jargon in the reservoir community is not accessible to all audiences of HESS, ex., ‘Inflow stochasticity’ in implicit stochastic optimization (ISO), explicit stochastic optimization (ESO), and parameter simulation optimization (PSO) in the Introduction.

Reply: Many thanks for your review, considering also the similar comments with Reviewer 1, we fully agree that the explanation of jargon needs a careful improvement to serve the wide community of audiences of HESS. We will carefully rewrite this part in the revision following the advices of both reviewers.

(7) The references could be updated.

Reply: Thanks for your comments. We will update the references with some recent and related literatures.

(8) Proofreading by a native English speaker should be conducted to improve both language and organization quality.

Reply: Many thanks for your comments. We will carefully check the revised version, and we will also look for professional language editing service for proofreading and language improvement before submitting the revised version.