

Interactive comment on “Improving multi-objective reservoir operation optimization with sensitivity-informed problem decomposition” by J. G. Chu et al.

Anonymous Referee #1

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This research proposes to use a global sensitivity analysis to obtain good initial solution which is fed into the multi-objective evolutionary algorithm. The proposed method improves the efficiency and effectiveness of multi-objective evolutionary optimization. The manuscript is suitable for publication. I have a few comments for the revision.

Lines 17-24 on page 3723: Does the red line with circle in Figure 1 represent water supply rule curve for agriculture itself or total water supply of agriculture and industry? If it is for agriculture itself, “The agricultural demand D1 could be fully supplied when the actual water storage is in zone 1, which is above the water supply rule curve for agriculture,” – does it mean agriculture has the higher priority than industry water use?

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However, "... the industrial demand D2 has to be rationed when the actual water storage is in zone 3, which is below the water supply rule curve for industry." I think that both D1 and D2 may need to be rationed when the water storage is in zone 2. Do I miss something? Please clarify the explanation for Figure 1.

Does the annual value of R in equation (2) equal to $W1,j+W2,j$?

Line 10 on page 3727: "need to be translated"

Lines 20-22: 39 decision variables for one year? Equation (1) shows there are more than 1 year.

Figure 4: Please explain why those decision variables are most sensitive, intuitively or conceptually. Same for Figure 8

Lines 4-7 on page 3734: "...the Pareto optimal solutions were then used as starting points to start a complete new search..." Since the Pareto optimal solutions from the simplified problem only include the sensitive decision variables, how are the initial values of insensitive variables for the full search determined?

Lines 6-21 on page 3735: From Figure 10, the authors conclude that the pre-conditioned full search is more reliable than the regular full search. Did you try different settings for the pre-conditioned full search? E.g., random seeds for obtaining the pre-conditioning search or other parameter settings.

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