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A leader-follower-interactive method for regional water resources management with considering multiple water demands and eco-environmental constraints

Yizhong Chen, Li He, Hongwei Lu, Jing Li, Lixia Ren

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1 **A leader-follower-interactive method for regional water resources management**
2 **with considering multiple water demands and eco-environmental constraints**

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4 Yizhong Chen¹, Li He^{1,2}, Hongwei Lu^{1,2,*}, Jing Li¹, Lixia Ren¹

5

6 ¹ *School of Renewable Energy, North China Electric Power University, Beijing,*
7 *102206, China.*

8 ² *State Key Laboratory of Alternate Electrical Power System with Renewable Energy*
9 *Sources, North China Electric Power University, Beijing, 102206, China.*

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11 * Corresponding author: Tel: +86-10-61772416; Fax: +86-10-61772416; Email:

12 luhw@ncepu.edu.cn

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14 **Abstract:** This study presents the mathematical formulation and implementations of a
15 synergistic optimization framework based on an understanding of water availability
16 and reliability together with the characteristics of multiple water demands. This
17 framework simultaneously integrates a set of leader-followers-interactive objectives
18 established by the different decision makers during the synergistic optimization. The
19 upper-level model (leader's one) determines the optimal pollutants discharge to satisfy
20 the environmental target. The lower-level model (follower's one) accepts the dispatch
21 requirement from the upper-level one and dominates the optimal water-allocation
22 strategy to maximize economic benefits representing the regional authority. The

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