Xiangyu Ma

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Faculty of Infrastructure Engineering, Dalian University of Technology, Dalian, China

OBJECTIVE

Graduate student looking for Ph.D. position starting in Fall 2024.

EDUCATION

Dalian University of Technology   Dalian, China

Degree: Master   GPA: 3.70/4   Sep 2021 - Present

Major: Hydrology and Water Resources

Advisor: Associate Prof. Shengli Liao

Dissertation: Research on the Water-Energy-Ecosystem Nexus and Multi-objective Optimization and Decision-making Analysis in Hydro-based Power System

Core Courses: Optimization Method, Mathematical Statistics, Water Resource System Analysis, Risk Analysis and Control, Operation Theory about Electricity Power and Hydropower Systems, Principle of System Engineering

Dalian University of Technology   Dalian, China

Degree: Bachelor   GPA: 3.26/4   Sep 2017 - Jun 2021

Major: Water Conservancy and Hydropower Engineering

Dissertation: Power Generation Scheduling of Cascade Hydropower Stations in Lancang River under Electricity Market Environment

Core Courses: Engineering Hydrology, Water Resources Planning and Utilization, Hydropower and New Energy, Economic Operation of Hydropower Stations, Basics of Water Informatics, Hydropower Information System and Database, Environmental Hydro Science

RESEARCH EXPERIENCE

Research on the Water-Energy-Ecosystem Nexus in hydro-based power systems   Apr 2023 - Present

- Establishing a multi-timescale two-layer nested framework to explore the Water-Energy-Ecosystem Nexus in hydro-based power systems .
- The outer layer consists of a long-term river basin-wide multi-objective optimization model, considering objectives such as water supply, hydropower generation, shipping, and sub-daily hydrological regime (hydropeaking).
- The inner layer consists of a scenario-based stochastic programming model for multiple grids peak shaving operation under uncertainty originating from variable renewable energy, with an hourly resolution.

Research on multi-objective decision analysis for hydropower system   Aug 2022 - Mar 2023

- Constructing a short-term multi-objective mixed integer linear programming (MILP) model integrating multiple uses of hydropower reservoirs, including peak shaving, ship navigation, and power generation.
- Developing a solution and decision-making framework based on Normalized Normal Constraint (NNC) and TOPSIS methods to obtain Pareto solutions and coordinate multi-sector performance.

Research on multi-objective co-scheduling of giant and re-regulation reservoirs   Feb 2022 - Jul 2022

- Employing constraint aggregation and hexahedron gridding strategies to handle high-dimensional non-convex and nonlinear constraints in hydropower operation and improve solution efficiency.
- Establishing a multi-objective optimization model based on Normal Boundary Intersection (NBI) and MILP to analyze and mediate the conflict between peak shaving and shipping.

Practice of basic methods in water resources system (Python)   Sep 2021 - Jan 2022

- Optimization methods for reservoir optimal operation: Genetic Algorithm (GA), Dynamic Programming (DP), Non-dominated Sorting Genetic Algorithm II (NSGA-II), etc.
- Machine learning methods for runoff forecasting : Artificial Neural Network (ANN), Support Vector Regression (SVR), Seasonal AutoRegressive Integrated Moving Average (SARIMA), etc.

PUBLICATIONS

Xiangyu Ma, Shengli Liao, Benxi Liu, Hongye Zhao, Chuntian Cheng, Huaying Su. Multi-objective solution and decision-making framework for coordinating the short-term hydropeaking-navigation-production conflict of cascade hydropower reservoirs. Journal of Cleaner Production. 2023. 422:138602. (JCR Q1, IF=11.1)

Shengli Liao, Huan Wang, Benxi Liu, **Xiangyu Ma**, Binbin Zhou, Huaying Su. Runoff forecast model based on an EEMD-ANN and meteorological factors using a multicore parallel algorithm. Water Resources Management. 2023. 37(4). 1539-1555. (JCR Q1, IF=4.3)

Shengli Liao, Hualong Yang, Benxi Liu, Hongye Zhao, Huan Liu, **Xiangyu Ma**, Huijun Wu. Daily peak-shaving model of cascade hydropower serving multi-grids considering an HVDC channel shared constraint. Renewable Energy. 2022. 199. 112-122. (JCR Q1, IF=8.7)

Huijun Wu, Shushan Li, Hongbing Tang, **Xiangyu Ma**, Xi Zhang, Shengli Liao. MILP method for multi-objective short-term optimization scheduling of cascaded hydropower stations coupling peak-shaving and navigation demands. Electric Power Automation Equipment, 2023. (EI, in Chinese)

HONORS AND AWARDS

Excellent Graduate of Dalian University of Technology	Sep 2023
Top 5%, Dalian University of Technology	
First Prize Scholarship of Dalian University of Technology	Sep 2023
Top 5%, Dalian University of Technology	
Second Prize Scholarship of Dalian University of Technology	2021 - 2022
Top 20%, Dalian University of Technology	
Third Prize in Structural Design Competition of Dalian University of Technology	Jun 2019
Top 20%, Dalian University of Technology	

SKILLS

Languages	Chinese (native speaker), English (IELTS, 7.0)
Programming	Python, MATLAB, C, R
Software	Gurobi (Optimizer), ArcGIS, Adobe Illustrator, Origin
Python Packages	Geatpy (Evolutionary Algorithm), Scikit Learn, Geopandas, etc
Typesetting	MS office, Latex, Markdown