Name Job Title Area of Expertise
SASAKI Soichi Assistant Professor Fluid Engineering

1. Main Research Topics

① Machine Learning for Aerodynamic Noise

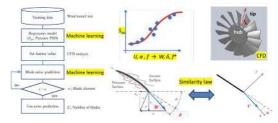
Fans are used for the heat exhaust of electronic devices, and there is a demand for these fans to operate quietly. I am engaged in research aimed at predicting the aerodynamic noise of fans by using machine learning. In data-driven machine learning, it is only possible to predict objective variables within the range of provided training data. This study focuses on methodology for the aerodynamic noise prediction using neural networks based on physical laws.

② Low GWP Binary Power Generation Units

According to international agreements on global warming, a numerical target has been set to reduce the use of HFC-based refrigerants as working fluids by 85% by 2036. To solve this societal issue, I am developing a low-GWP binary power generation unit. In addition, I am developing technologies to control the operation of these power-generation units through adaptive machine learning. A distinctive feature of this control is that the machine learns the optimal conditions for autonomous operation while continually experimenting in real-time.

③ Stall-Controlled Wind Turbines

To create stall-controlled wind turbines, I aim to establish a unique methodology by integrating machine learning with the aerodynamic analysis of blade elements, thereby achieving blade design, aerodynamic noise prediction, and operation control. I am currently studying the feasibility of designing rotors based on Bayesian optimization. Furthermore, I am engaged in research on methodologies for predicting the aerodynamic noise generated from rotors based on trailing-edge noise theory.



Machine learning of low-pressure fan noise





R&D of low-GWP binary power generation unit





Stall-controlled offshore wind turbine

2. Keywords

Fan, Aerodynamic Noise, Organic Rankin Cycle, Adaptive DOE, Wind Turbine, Water Tunnel Test

3. Remarks and Websites

A hydroelectric power generation machinery jointly developed by a corporation was implemented in Niigata Prefecture. I am also accepting researcher from a corporation involved in offshore wind power generation and am considering the application of stall-controlled wind turbines to offshore wind power generation. To implement outcomes in society, it is necessary to take the initiative and act proactively. By constantly maintaining the motivation for the future and staying close to society, I can realize the social implementation of our research. Through these research activities on renewable energy machinery, we are working to expand the scope of planetary health research.

- (1) JSPS, KAKEN, Grant-in-Aid for Scientific Research (C), 21K12294, 2021-2024.
- (2) JSPS, KAKEN, Grant-in-Aid for Scientific Research (C), 24K08325, 2024-2027.
- (3) JST, Adaptable Seamless Technology Transfer Program through target-driven R&D, (2025.7, under reviewing.)

researchmap: https://researchmap.jp/read0055706?lang=en