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Robust Power Supply Model for Hybrid Renewable Energy System under Parameter Uncertainty

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Abstract

Hybrid renewable energy system (HRES), which combines several renewable power, including photovoltaics (PV) and wind power, and a small portion of power generated by conventional power generators as backups when the renewable power is insufficient, is gaining more popularity over the decades because it has minimal impact on environment and health. However, due to the uncertain amount of power generated by the HRES, the HRES-based power supply can be very unstable. In this paper, we propose a two-stage stochastic programming model and an analysis methodology to ensure the robust power supply for HRES when the distribution of the amount of renewable power is ambiguous. In order to validate the performance of our methodology, we create some realistic-size scenarios to test the model and the proposed analysis methodology. Results show that the instances can be efficiently solved.

Keywords
Energy management, hybrid renewable energy system, risk management

Biography

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