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A study on the renewable energy facilities planning with a large area connection of Hokkaido power grid

Yuji Ito, Shin'ya Obara and Masaki Okada
Kitami Institute of Technology, Japan

Introduction of renewable energy such as wind and solar power are being promoted aiming to reduce the negative environmental impact. However, introduction of the renewable energy requires a large-scale backup power supply and energy storage device to compensate the unstable output fluctuation caused by weather variations, as a consequence, reduction of equipment cost is an issue. On the other hand, by renewable energy such as solar power and wind power generation which are distributed in a wide area to the power grid, it has been reported that the power variation is reduced. However, in order to realize a wide area interconnection of renewable energy, it is necessary to define the locations and capacities of renewable energy plants. In this study, we used a genetic algorithm (GA) that can perform optimization of multi-variable function having a nonlinear characteristic. We have developed a computer algorithm to investigate the basic economics of the interconnection by the distributed renewable energy plants when capacity of renewable energy plants are used as a variable. In the case study, it was evaluated to analyze the capacity of arrangement and installed capacity of renewable energy plant, and backup power supply and energy storage device in Hokkaido, Japan.

Biography

Yuji Ito is currently a Master's student at the Kitami Institute of Technology.

m1552300024@std.kitami-it.ac.jp

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