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| **Title:** | Optimal Power Flow Solutions Incorporating Stochastic Wind Power Generators by Moth Flow Optimizer | | |
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| **Published Journal Name:** | Engineering Technology International Conference (ETIC 2022), Online Conference, Kuantan, Malaysia, 2022 | | |
| **Type of Publication:** | Conference | | |
| **Volume:** |  | Issue |  |
| **Publisher:** | IET | | |
| **Publication Date:** | 2022 | | |
| **ISSN:** |  | | |
| **DOI:** | doi: 10.1049/icp.2022.2582 | | |
| **URL:** | https://ieeexplore.ieee.org/document/10106728 | | |

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| **Abstract:** |  |
| The variables that maximize an objective function, specific equality requirements, such as the power balancing and power flow equations, and inequality constraints, restrictions on the variables, are the most crucial elements of the optimal power flow (OPF). The set of parameters and constraints, as well as the shape of the objective, will vary depending on the type of OPF. Additionally, with the gradual integration of renewable energy sources into the contemporary smart grid, it is now possible to develop new optimization problems with a substantially greater number of variables. In this paper, a method for choosing the optimal power flow in a system including both conventional thermal power plants and stochastic wind turbines is presented. To anticipate wind energy output, Weibull and lognormal probability distribution functions are used, respectively.  The loss from overestimating intermittent renewable sources and the penalty factor from underestimating them are both considered by the objective function. To handle the optimization problem in the IEEE 30 bus system, Moth Flow Optimizer (MFO) and Graw Wolf Optimization are used (GWO). The approach's combination and design produce the best outcomes, which meet all network limitations. | |