

## **Improvement of the Robust Proportional-Integral-Derivative (PID) Controller Parameters for Controlling the Frequency in the Intelligent Multi-Zone System at the Present of Wind Generation Using the Seeker Optimization Algorithm**

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**Abstract :** The seeker optimization algorithm (SOA) is increasingly gaining popularity among the researchers society due to its effectiveness in solving some real-world optimization problems. This paper provides the load-frequency control method based on the SOA for removing oscillations in the power system. A three-zone power system includes a thermal zone, a hydraulic zone and a wind zone equipped with robust proportional-integral-differential (PID) controllers. The result of simulation indicates that load-frequency changes in the wind zone for the multi-zone system are damped in a short period of time. Meanwhile, in the oscillation period, the oscillations amplitude is not significant. The result of simulation emphasizes that the PID controller designed using the seeker optimization algorithm has a robust function and a better performance for oscillations damping compared to the traditional PID controller. The proposed controller's performance has been compared to the performance of PID controller regulated with Particle Swarm Optimization (PSO) and Genetic Algorithm (GA) and Artificial Bee Colony (ABC) algorithms in order to show the superior capability of the proposed SOA in regulating the PID controller. The simulation results emphasize the better performance of the optimized PID controller based on SOA compared to the PID controller optimized with PSO, GA and ABC algorithms.

**Keywords :** load-frequency control, multi zone, robust PID controller, wind generation

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