

Wind Diesel Hybrid System without Battery Energy Storage Using Imperialist Competitive Algorithm

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Abstract : Nowadays, the use of renewable energy sources has been increasingly great because of the cost increase and public demand for clean energy sources. One of the fastest growing sources is wind energy. In this paper, Wind Diesel Hybrid System (WDHS) comprising a Diesel Generator (DG), a Wind Turbine Generator (WTG), the Consumer Load, a Battery-based Energy Storage System (BESS), and a Dump Load (DL) is used. Voltage is controlled by Diesel Generator; the frequency is controlled by BESS and DL. The BESS elimination is an efficient way to reduce maintenance cost and increase the dynamic response. Simulation results with graphs for the frequency of Power System, active power, and the battery power are presented for load changes. The controlling parameters are optimized by using Imperialist Competitive Algorithm (ICA). The simulation results for the BESS/no BESS cases are compared. Results show that in no BESS case, the frequency control is more optimal than the BESS case by using ICA.

Keywords : renewable energy, wind diesel system, induction generator, energy storage, imperialist competitive algorithm

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