

Title: Power Profile Smoothing of PV Power Plant with a Fuzzy Logic Controlled Battery Energy Storage System(Conference Paper)

Author

Zobayer, A.M., Shuvo, B.A., Mohammad, N.

Abstract

This study concentrates on the power profile smoothing of solar power plants (grid-connected) due to weather intermittency. A battery energy storage system (BESS) is introduced for the smoothing purpose. A fuzzy logic-based reference current generator of 45 rules is embedded for controlling the battery energy storage system. This system substantially helps develop a controllable renewable energy generation model. We aimed to minimize the natural crests and troughs found in the power generation curve of solar power plants while keeping the battery SOC within 50%. The real-time power generation curve was compared with a reference power curve. For generating the reference power curve we leveraged the Maximum Power Point Tracking (MPPT)-Model Predictive Control algorithm. At any particular location, the reference power curve was obtained from the forecasted irradiation and temperature of that day. Membership functions and rule base of the fuzzy logic-based controller are adjusted to obtain the power profile like the reference power generation curve. The obtained result is offline simulation-based and all the practical data was taken from Kaptai solar power plant (Lat:22.493286, Long: 92.218809), which was the first of its kind in Bangladesh. © 2023 IEEE.

Author keywords

fuzzy logic controlMaximum Power point trackingModel Predictive controlReference power curveSolar power plant

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