Load Frequency Control in Microgrid Using Fuzzy Logic Table Control

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Abstract—**This paper presents the load frequency control in isolated ac microgrid using fuzzy logic table control. The objective of load frequency control is to hold the frequency constant against any load changes. The main task of microgrid is to maintain the voltage level supply to the loads. Any mismatch between the power generations and loads create to the major problem of frequency fluctuation that effected to the active power sharing and reliability in microgrid power flow. In this paper, the model of the generation unit in microgrid is carried out for proposing the load frequency control using fuzzy logic table. The comparison of the proposed method is compared with the common proportional integral (PI) controller. The simulation results have shown that the proposed method is better than PI controller in term of transient performance. The simulation is carried out through the Matlab/Simulink environment.**

Keywords—fuzzy logic table control; PI controller; load frequency control; synchronous generator.

I. Introduction

Power system can be considered as the generated power supplied to different loads containing active and reactive powers, and constant frequency during steady-state operation [1]. During the steady-state, there is a possibility of the changes in the loads incessantly that make the frequency fluctuated. Mainly, when decreases in the load, the system frequency will affect to rise if the power reference is kept at zero. Similarly for the load increases, the frequency may drop [2] .

sources. The converter interfacing is used to control the output power of each DG units [6], so as the optimal output power could be achieved [7]. As known as highly intermittent of RES, the energy storage devices are normally attached to enhance the reliability of microgrid. The synchronous generator/diesel generator is often used to support the power produced in RES. This generator is normally driven by turbine that responsible for maintaining the frequency in the ac microgrid. Hence, the frequency is directly proportional to the speed of the synchronous generator (SG) [8].

Essentially, a control approach is to cancel the effects of the random load changes and to keep the frequency and voltage at the standard values. In practice, the load frequency control (LFC) mostly uses PI controllers. However, since the PI parameters are usually tuned based on analytical or trial-and-error approaches, they are incapable of obtaining good dynamic performance for various load changes scenarios [9]. The conventional LFC designs are usually suitable for working at specific operating points, and they are not more efficient for a modern power grid network, especially in microgrid system that uses RES as power sources [10].