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BES and SSSC Based Supplementary Control for Frequency Regulation of Multi Area Interconnected Power System Network

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Abstract:

This paper develops the tilt-integral-derivative (TID) plus filter (F) based on the fruit fly optimization (FFO) algorithm for the stability of the interconnected power system (IPS). The dynamic behavior of considered IPS is analyzed by laying the step load disturbance (SLD) of 10% in area-1 under the FFO-based TIDF controller. However, the efficacy of TIDF is revealed with other available controller performances in the literature. Moreover, the time delays (TDs) are believed with the IPS network to conduct the dynamic analysis near to performance is revealed. Further, the system is integrated with storage (BES) and static synchronous series compensator (SSSC) reveal the improvement in system dynamic behavior with the supplementary controller.

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I. Introduction

Load frequency control (LFC) is a trivial aspect when it comes to the operation and regulation of the IPS network. The LFC has a primary relationship with the major constraint of the IPS while assessing the network stability. The frequency of the IPS network is the primary indicator that the electrical engineers on the demand management side are concentrated in order to make the entire electrical system more reliable. The change in generation load and is termed the real power mismatch (RPM), directly affecting the network frequency. Therefore, the RPM in the IPS network is to be controlled to ensure the network frequency does not violate the limits. Thus, an automatic controller is required to monitor and regulate the RPM [1] in a timely manner in establishing the IPS network stability.

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