Abstract

This paper proposes a sophisticated application of Redox Flow Batteries (RFB) coordinated with Unified Power Flow Controller (UPFC) for the improvement of Load Frequency Control.
(LFC) of a multi-unit multi-area power system. The UPFC offers an effective means to enhance improvement in the power transfer capability of the tie-line. The main application of UPFC is to stabilize the frequency oscillations of the inter-area mode in the interconnected power system by the dynamic control of tie-line power flow. The Redox flow batteries, which are not aged to the frequent charging and discharging, have a quick response and outstanding function during overload conditions. In addition to leveling load, the battery is advantageous for secondary control in the power system and maintenance of power quality of distributed power resources. The Artificial Bee Colony (ABC) algorithm is used to optimize the parameters of UPFC and the cost function of the two area power system along with the integral controller. Simulation studies reveal that the frequency control concept and control design of a RFB coordinated with UPFC units enhance the inertia centre mode as well as inter-area oscillation modes interms of peak deviations and settling time as compared to the output responses of the system obtained without UPFC and RFB units.

References

Design of Load-frequency Controller using Artificial Bee Colony Algorithm for an interconnected power system


Index Terms

Computer Science

Power Systems
Keywords

Artificial Bee Colony
Unified Power Flow Controller

Load-Frequency Control
Integral Controller
Cost Function

Redox Flow Batteries