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Development of PSS/E Dynamic Model for Controlling Battery Output to Improve Frequency Stability in Power Systems

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Abstract : The power system frequency falls when disturbance such as rapid increase of system load or loss of a generating unit occurs in power systems. Especially, increase in the number of renewable generating units has a bad influence on the power system because of loss of generating unit depending on the circumstance. Conventional technologies use frequency droop control battery output for the frequency regulation and balance between supply and demand. If power is supplied using the fast output characteristic of the battery, power system stability can be further more improved. To improve the power system stability, we propose battery output control using ROCOF (Rate of Change of Frequency) in this paper. The bigger the power difference between the supply and the demand, the bigger the ROCOF drops. Battery output is controlled proportionally to the magnitude of the ROCOF, allowing for faster response to power imbalances. To simulate the control method of battery output system, we develop the user defined model using PSS/E and confirm that power system stability is improved by comparing with frequency droop control.

Keywords : PSS/E user defined model, power deviation, frequency droop control, ROCOF (rate of change of frequency)
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