Design and simulation of resistive type SFCL in multi-area power system for enhancing the transient stability

K. Peddakapu[a], M.R. Mohamed[a], M.H. Sulaiman[a], P. Srinivasarao[b], S. Rajasekhar Reddy[c]

[a] Faculty of Electrical & Electronic Eng., Universiti Malaysia Pahang, Pekan, Malaysia

[b] Department of Electrical & Electronic Eng., Nalanda Institute of Eng.&Tech., A.P, India

[c] Department of Electrical & Electronic Eng., SRKR Engineering College, A.P, India

ABSTRACT

This paper presents a novel approach in two-area interconnected power system for enriching the transient stability at perturbations. The challenging task in the interconnected system is to equalize the power production and load demand without changing the system parameters. Therefore, a sophisticated controller of flexible alternating current transmission system (FACTS) called distributed power flow controller (DPFC) is suggested to the two-area power system for enhancing the system stability. Furthermore, the resistive type superconducting fault current limiter (SFCL) is also suggested to employ with DPFC for alleviating the fault current, and power quality issues. In this work, three cases are investigated by using without auxiliary, SFCL, unified power flow controller (UPFC), SFCL-UPFC, and SFCL-DPFC on two-area multi-machine system. The objectives of the paper are to determine and evaluate the fault current, variations in voltage and inter-area oscillations, ascertain the performance of suggested techniques at diverse fault-clearance times, and find out the finest control method for different kinds of faults. The simulation outcomes disclose that the coordination of SFCL and DPFC yielded finer outcomes over other control approaches.

KEYWORDS

Multi-machine system; Transient stability; Resistive type superconducting fault current limiter; Fault Current; Distributed Power Flow Controller; Inter-Area Oscillations

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