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A New Relaying Algorithm to Detect Loss of Excitation of Synchronous Generators

Ömer USTA[1], M. H. MUSA[2], M. BAYRAK[3] and M. A. REDFERN[4]
[1]İstanbul Technical University, 34469 Maslak, İstanbul-TURKEY
e-mail: usta@elk.itu.edu.tr
[2]University of Alfateh, Electrical Engineering-LIBYA
[3]Sakarya University, Electrical and Electronics Engineering, Sakarya-TURKEY
[4]University of Bath, Electronics and Electrical Engineering, BA2 7AY Bath, UK

Abstract: A new digital relaying algorithm is introduced for the protection of synchronous generators against loss of excitation conditions. The new algorithm is based on measuring of the 3-phase reactive power output of the machines, and monitors the direction and magnitude of leading reactive power at the generator terminal. The protection algorithm is designed such that it can provide reliable protection against loss of field conditions and remains stable during recoverable power system swing conditions. While the new relay produces a trip signal for partial loss of field conditions causing the machine to lose its stability, it remains stable for the partial loss of field conditions that can be corrected via machine excitation and AVR systems.

Key Words: Digital relaying, generator protection, reactive power, loss of field, capability curve

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