

The Analysis of Loss-of-Excitation Algorithm for Synchronous Generators

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Abstract : This paper presents the results of the study in which the excitation system fault of synchronous generator is simulated. In a case of excitation system fault (loss of field), distance relay is used to prevent further damage. Loss-of-field relay calculates complex impedance using measured voltage and current at the generator terminals. In order to obtain phasors from sampled measured values, discrete Fourier transform is used. All simulations are conducted using Matlab and Simulink software package. The analysis is conducted on the two machine system which supplies equivalent load. While simulating loss of excitation on one generator in different conditions (at idle operation, weakly loaded, and fully loaded), diagrams of active power, reactive power, and measured impedance are analyzed and monitored. Moreover, in the simulations, the effect of generator load on relay tripping time is investigated. In conclusion, the performed tests confirm that the fault in the excitation system can be detected by measuring the impedance.

Keywords : loss-of-excitation, synchronous generator, distance protection, Fourier transformation

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