

Sorot Auyporn 2012: EMTP/ATP-Based Transient Short Circuit Fault Simulation for Percentage Transformer Differential Relay Performance Testing. Master of Engineering (Electrical Engineering), Major Field: Electrical Engineering, Department of Electrical Engineering. Thesis Advisor: Associate Professor Santi Asawasripongton, M.Eng.Sc. 228 pages.

This thesis describes the methodology for percentage transformer differential relay performance testing in transient condition. Digital model of power transformer and current transformer are established from EMTP/ATP program which using the field test report parameter. The testing consists of magnetizing inrush current and short circuit condition. The output of the current transformer model is PL4 format file which is compatible to the existing microprocessor-based relay test set available. The experimental work presented in this thesis focuses on the reliability evaluation of magnetizing inrush current effect from automatic reclosing of circuit breaker at the upstream substation by considering of 2nd Harmonics blocking function. The other topic for reliability evaluation is short circuit condition which has occurred at the out zone of power transformer protection which considering the response of two commercially available percentage transformer differential relays. The main benefits of this thesis work are twofold. Firstly, the procedures described in this thesis can be used by a utility to find optimum settings for each percentage transformer differential relay for a full range of expected power system contingencies. Secondly, the response of the tested percentage transformer differential relays from several manufacturer can be compared and the best relays selected for a specific application. They can make the transformer protection systems are secure and reliable which not cause extensive power outage due to malfunction of the relay.

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