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Distance Relaying Algorithm for Double-Circuit Transmission Line with Compensation for Reactance Effect under Standard Availability of Measurements

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**Abstract:** This paper deals with non-pilot distance protection of a double-circuit transmission line. Negative impact of the reactance effect, appearing in measuring a fault loop impedance, on operation of the relay is discussed. An adaptive algorithm allowing one to prevent the relay from mis- or mal-operation caused by the reactance effect is introduced. The algorithm is designed for a standard availability of measurements from one end of the double-circuit line, i.e. when three-phase voltage and current from the faulted line circuit, and additionally zero-sequence current from the healthy line circuit, are provided as the relay input signals. The algorithm is based on changing the position of the distance relay characteristic in such a way that the reactance effect is effectively compensated for. For this purpose the shift vector is determined in on-line relatively simple calculations. The delivered adaptive algorithm has been tested using current and voltage signals obtained from simulation of various faults using the ATP-EMTP software program. Selected results of the evaluation are presented.

**Key Words:** Double-circuit transmission line, distance protection, fault, fault loop impedance measurement, reactance effect, adaptive characteristic

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