

ABSTRACTComputation of Impedances Seen by Distance Relays

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A systematic assessment of the discriminative performance of distance protection with a view to establishing a basis for the choice of forward reach settings requires a thorough appreciation of the magnitude of the various errors associated with the apparent impedances seen by distance relays.

In this project a computer program is developed to compute accurately the impedance measured by distance relays when faults to earth occur at any point along a double circuit transmission line, including the case when one circuit is isolated and earthed at both ends. The program uses a method in the phase frame of reference in which polyphase network conditions are represented by phase voltages, currents and impedances/admittances instead of transferring the phase quantities to symmetrical components and back again. The effectiveness with which the program can be applied to evaluate the magnitude of the errors arising from the effects of interphase and intercircuit mutual coupling, non-transposition of conductors, scalar approximation of complex ratios and fault resistance, and to examine the effect on these errors due to changes in fault and pre-fault operating conditions is demonstrated.