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ABSTRACT

PhD thesis
„*Fault location on power transmission lines using artificial neural networks*"

PhD thesis concerns a very important and present problem of identifying disturbances in the electric power system. In particular, it shows the use of artificial neural networks for locating faults on power transmission lines for an inspection-repair purpose. The aim of the research was to show that the use of artificial neural networks can improve accuracy of fault location in comparison to location with the impedance algorithms. The starting point for the carried analyzes was to consider the fault location with impedance algorithms, using:

- measurements using three-phase voltages and currents from one end of the line
    - algorithm developed by Takagi (algorithm known in the literature)
- using the measurements of three-phase voltages and currents from both ends of the line
    - own algorithm formulated for the natural loop of short-circuit.

It has been shown that using these algorithms certain limitations with respect fault location accuracy, when taking into account the possibility of changes in the parameters of the transmission system in wide range and under the conditions of arc faults, as well as the appearance of core saturation of current transformers. It has been shown that using the developed structure of the artificial neural network, has resulted in improving of fault location accuracy. Use of artificial neural networks for filtering of the input signals of a fault locator has been proposed.

Quantitative analysis of location accuracy was performed using the signals from the versatile simulation of the linear short-circuits and the arc faults on power transmission lines using the ATP-EMTP software.

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