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INVESTIGATION OF IMPEDANCE-DIFFERENTIAL PROTECTION'S ALGORITHM AS A FAULT LOCATOR FOR DOUBLE-CIRCUIT TRANSMISSION LINE

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Authors

J. Herlender*, **J. Izykowski****, **B. Brusilowicz*****

Wroclaw University of Science and Technology,
27, Wybrzeze Wyspianskiego st., 50-370 Wroclaw, Poland,
e-mail: justyna.herlender@pwr.edu.pl

* ORCID ID : <https://orcid.org/0000-0002-9469-4546>

** ORCID ID : <https://orcid.org/0000-0002-1048-5510>

*** ORCID ID : <https://orcid.org/0000-0002-4113-2689>

Abstract

This paper deals with an analysis of impedance-differential protection algorithm applied to locate faults on a double-circuit transmission line. In particular, the study of fault location accuracy for the case of using the relation between currents for negative-sequence not for zero-sequence, as it was presented so far, is provided. It results from the well-known fact that zero-sequence impedances are in practice considered as quite unreliable data. Therefore, one has to limit usage of zero-sequence impedance parameters as much as possible. Such approach was applied in this paper and therefore the use of the additional relation of currents for negative-sequence is under investigation. The fault signals from ATP-EMTP simulation on the sample double-circuit transmission line was applied for evaluating the fault location accuracy. References 8, figures 4, table 1.

Key words: double-circuit line, transmission line, fault location, ATP-EMTP, simulation, algorithm, negative and zero sequences

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1. Premalata J., Ashokkumar P. An integrated approach for directional relaying of the double-circuit line. *IEEE Trans. Power Del.* 2011. Vol. 26. Pp. 1783-1792. DOI: <https://doi.org/10.1109/TPWRD.2011.2107922>
2. Eissa M.M., Masoud M. A novel digital distance relaying technique for transmission line protection. *IEEE Trans. Power Del.* 2001. Vol. 16. No 3. Pp. 380–384. DOI: <https://doi.org/10.1109/61.924814>
3. Bhalja B., Maheshwari R. High-resistance faults on two terminal parallel transmission line: Analysis, simulation studies, and adaptive distance relaying scheme. *IEEE Trans. Pow. Del.* 2007. Vol. 22. No 2. Pp. 801-812.
DOI: <https://doi.org/10.1109/TPWRD.2007.893352>
4. Bolandi T.G., Seyedi H., Hashemi S.M, Nezhad P.S. Impedance-differential protection: A new approach to transmission line pilot protection. *IEEE Trans. Power Del.* 2015. Vol. 30. No 6. Pp. 2510–2517. DOI: <https://doi.org/10.1109/TPWRD.2014.2387689>
5. Hinge T., Dambhare S. Synchronised/unsynchronised measurements based novel fault location algorithm for transmission line. *IET Generation, Transmission & Distribution*. 2018. Vol. 12. No 7. Pp. 1493-1500.
DOI: <https://doi.org/10.1049/iet-gtd.2017.0638>
6. Solak K., Herlender J., Izykowski J. Transmission line impedance-differential protection with improved stabilization for external fault cases. *19th Intern. Sc. Conf. on Electric Power Engineering (EPE)*. Czech Republic, May 16-18, 2018. URL: <https://ieeexplore.ieee.org/document/8396003>
(accessed at 09.01.2020)
DOI: <https://doi.org/10.1109/EPE.2018.8396003>
7. Herlender J., Solak K., Izykowski J. Impedance-Differential Protective Algorithm for Double-Circuit Transmission Lines, *Przegląd elektrotechniczny*. 2019. No 11. Pp. 238-242. DOI: <https://doi.org/10.15199/48.2019.11.55>
8. Hoidalén H.K., Prikler L., Hall J.L. ATPDraw™ - The graphical preprocessor to ATP, 2016. URL: http://www.elkraft.ntnu.no/ela/papers/kh_jun99a.pdf
(accessed at 09.01.2020)

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