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THE COMPARISONS TECHNIQUE OF COEFFICIENT DWT FOR IDENTIFYING SIMULTANEOUS FAULT TYPES ON TRANSMISSION SYSTEM

Atthapol Ngaopitakkul and Chaiyan Jettanasen

Faculty of Engineering
King Mongkut's Institute of Technology Ladkrabang
Chalongkrung Rd., Ladkrabang, Bangkok 10520, Thailand
knatthap@kmitl.ac.th

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Abstract. *Several decision algorithms have been reported in the literature for fault classification, but the effects of simultaneous faults have been neglected. This paper is focused on the decision algorithm for identifying the types of simultaneous fault along the transmission systems using discrete wavelet transform (DWT). The comparison of coefficients DWT has been carried out. DWT is used in order to detect high frequency components of the fault current signals. The coefficient details (phase A, B, C and zero sequence of post-fault current signals) of DWT at the first peak time that positive sequence current can detect fault, are performed as comparison indicator in order to classify fault types. Various cases based on Thailand electricity transmission systems are studied to verify the validity of the proposed algorithm. It is found that the technique proposed in this paper gives satisfactory results to precisely identify simultaneous fault types on transmission systems.*

Keywords: Discrete wavelet transform, Simultaneous fault, EMTP, Fault types

1. **Introduction.** In power system operation, protection of transmission lines is an important task to maintain power systems. The method of symmetrical components based on fault analysis exists for over 60 years in various protective relay applications. In the literature for fault classification, several decision algorithms used for fault classification and identification have been developed to be employed in the protective relays [1-5]. These several decision algorithms have different solutions and techniques [1-10]. In addition, artificial intelligence (AI) has been also reported in the literature for fault classification [3,4]. H. Wang et al. [4] present a new approach of real-time fault detection and classification in power transmission systems by using fuzzy-neuro techniques. In [11], the paper studied on five different neural network models applied to classification of faults on complex transmission lines. A fault classification method based on a radial basis function (RBF) neural network with orthogonal-least-square (OLS) learning procedure was used to identify various patterns of associated voltages and currents [12].

The development of algorithm to detect faults on the transmission lines has been progressed. This developed technique is known as a transient-based protection [13]. In order that the transient-based protection can be accurately applied in operation, the application of wavelet transform is used [14-19]. The wavelet transform was initially proposed in the literature for fault classification by O. A. S. Youssef [20,21]. In several research papers [5,20-23], the fault current signals are decomposed into various scales of the wavelet transforms. By considering the pattern of the spectra [5], the fault diagnosis can be achieved. The fault classification can be obtained from employing trial and error method [5,21]. In [21], the paper presents the wavelet transform concept and its value in classification