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A review on fault classification methodologies in power transmission systems: Part-II

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Abstract

The countless extent of power systems and applications requires the improvement in suitable techniques for the fault classification in power transmission systems, to increase the efficiency of the systems and to avoid major damages. For this purpose, the technical literature proposes a large number of methods. The paper analyzes the technical literature, summarizing the most important methods that can be applied to fault classification methodologies in power transmission systems.

The part 2 of the article is named "A review on fault classification methodologies in power transmission systems". In this part 2 we discussed the advanced technologies developed by various researchers for fault classification in power transmission systems.

Keywords: Transmission line protection; Protective relaying; Soft computing techniques

Contents

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1. Introduction

Transmission lines safeguard against exposed fault is the most critical task in the protection of power system. The purpose of a protective relaying is to identify the abnormal signals representing faults on a power transmission system. For high speed protective relaying, fast and accurate fault classification and the key essential in a transmission line. Recent technological advancement in soft computing techniques creates an interest to engineers to do research in this area. Earlier various researchers have proposed different schemes for fault classification. The problem is raised, whenever a new user starts his research in this area, he/she may get confusion to select the method to classify the nature of the fault. Because, so many researchers have already developed different methods but each method have their own advantages and disadvantages. So this review article will give the clear idea about all the existing methods in fault classification by selecting papers from reputed journals. The simulation process can be done in so many softwares. The user may not be aware of all the softwares. This review also gives details in the comparison table, about which software tool is used for simulation in that particular technique. Part 1 explains introduction of faults and necessity to do a review in this area and explanation of prominent and hybrid techniques.

This part 2 of this article is prepared as follows. First, Section 2 mainly focused on explanation of selected papers in different newly existed approaches. Second, Section 3, focused on the comparison of modern fault classification techniques in transmission lines and the concluding explanations of part 2.

2. Survey on fault classification methods

Q5 We have seen the explanation of prominent and hybrid techniques in part 1 of the article. Now the explanation of modern techniques is as follows:

C. Modern techniques

Q6 Nowadays, these modern techniques are being implemented for fault analysis in power transmission systems. The various recently developed techniques are explained below.

C.1 Support vector machine

A novel technique for learning separating functions in classification (pattern recognition) tasks or for performing functional estimation in regression problems is support vector machine (SVM). It is a computational learning technique based on the statistical learning theory. In this the input vectors are nonlinearly mapped into a high dimensional feature space. It has been effectively applied to many classification problems. The explanations of papers based on SVM are given below.

Malathi and Marimuthu (2008), has presented a method for the classification of faults using multi-class support vector machine (SVM) in power transmission systems. This method uses data from the wavelet decomposition of post fault currents as input to support vector machine for classification of faults in transmission system. The specialty of this approach is SVM trained to become optimized classifier and with less amount of training samples (Malathi and Marimuthu, 2008).

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