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STUDY ON WAVELET TRANSFORM
FOR DETECTING TIME ARRIVAL
OF FAULTS WAVE

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ABSTRACT

The fault generated transient traveling waves are wide band signals which cover the whole frequency range. The detection of faults location appearing in a power system is extremely important. Estimation and determination of fault location in power transmission system are very vital to repair the fault damage happen on the apparatus quickly and to restore supply with minimum interruption. The objectives of this thesis is, firstly to measure the accuracy of fault distance based on traveling wave depends on arrival time of fault wave. Secondly, to investigate the types of wavelet transform which is more compatibility to determine the distance of faults. This thesis presents the determination of fault distance on the power transmission line. The cable of the transmission line is modeled in MATLAB Simulink using simpower system tool box. There are two different wavelet transform to be investigated which is by using Coif Let, Haar and Mexican Hat transform. This three type wavelet transform are used to analyze the arrival time of the fault signal. Result between three types wavelet will be compared. This simulation result show that Haar wavelet is suitable and efficient powerful tool to estimate the fault distance when occur on the power transmission system.

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INTRODUCTION

1.0   RESEARCH BACKGROUND

Power systems have grown rapidly over the last few decades, and the number and length of transmission lines increased. Transmission lines are exposed in the field, and, especially in the mountains and hilly terrains, they are prone to failure. In this scenario, a fast and accurate fault location technique is essential to reduce the restoration time of power systems, which is important with respect to technical and economic issues. Therefore, the study and development of fault location have been motivated since the 1950s [1]. The traveling-wave-based fault location method has been proposed by lots of researchers because these are insensitive to load flow, transition resistance, wiring ways, and series compensation. The power industry is an essential part of a country. Typically, there are three parts of a power system such as generation, transmission, and distribution. All of them are indispensable for the entire power system. In recent years, the power system is increasing sophisticated. The transmission lines are longer and longer. The voltage level on transmission line is also higher and higher. However, the faults of the transmission lines are difficult to avoid. Thus faults endanger the safety and the reliability of the power system. The longer the power outages, the greater the damage caused. Therefore, quickly pinpointing the faults location and restoring power supply is required by all utilities. In order to fix the faults rapidly, finding the accurate location of fault point is the key. Thus, the subject of fault location estimation for the transmission line is especially interesting to electric engineer and utilities.