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A versatile methodology for preventing a parallel transmission system using impedance-based techniques

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ABSTRACT

The various configurations that exist for a compatible circuit depend on an object, such as operating conditions, the occurrence of an inter-circuit error and the result of the coupling of the transmission line. This feature makes the protection of the same transmission lines very difficult. This paper introduces a new algorithm based on a state diagram that contains location data collected on a passing bus. Combine the different separation processes and the impedance-based process is used. The classification process cannot detect internal errors and only compares with existing phases where the same regional error occurs in the 2D space and the impedance-based method used to cover the resulting error. The proposed algorithm incorporates impedance-based methodology and separation technology to provide the appropriate response under all operating conditions of the same circuits.

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1. INTRODUCTION

Parallel transmission lines are all now widely used in the electrical network and they're less expensive to develop than new designs. That alone ensures this same transmitting line's dependability and safety [1]. Because of their higher frequencies, parallel configuration power lines set up in the same towers are used on high-voltage transmission implementations. But the factors like the mutual coupling effect, inter-circuit faults, external faults, and the faults that occur due to different operating conditions of the parallel transmission line make the protection of a parallel transmission a challenging task [2]. The current differential protection scheme using a communication link between the ends of the transmission line could provide accurate protection of the parallel transmission line. But the reliability of the transmission line is directly proportional to the reliability of the communication links hence the protection system could use the algorithm which depends on the local information available at the relay point will help the protection system of the parallel transmission line for accurate fault detection and mitigation [3].

If a traditional distance relay is being used to protect a parallel transmission system, mutual inductance has an effect on the distance relay's performance [4]. When both line segments are operational, if the distance relay is established to secure 80% of the total of the transmission network, and besides based on mutual linkage, this only protects 50% of the line. In contrast, when one of the lines has been out of the system or grounded at both endpoints, the distance relay would provide 100% coverage [5], [6].