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Fault Distance Calculation Considering Sequence Impedance Values on The Distribution Network

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Abstract. Fault on distribution line needs to be stored as quickly as possible. It is due to fault effect to the damage of equipment and blackout. In this paper, single line to ground fault is considered in the simulation. The fault distance calculation is used an impedance-based method. The value of negative and positive sequence impedance was utilized in the formulation. The various distances in each section are simulated in order to observe the accuracy of the impedance-based method. The test network was adopted from the real data from Tenaga Nasional Berhad (TNB) Malaysia. The network was installed as an underground distribution network with 19 nodes (branches and main feeder). The obtained result shows that by considering sequence impedance to the fault distance calculation, it is able to generate acceptable accuracy.

Keyword : Fault Distance, Impedance Line, Sequence Impedance, Distribution Network.

INTRODUCTION

In power system, fault is very important parts that need to solve. A fault in a circuit is any failure which interferes with the normal current. Fault in the circuit have a main factor such as over-load in distribution system network, fault on electrical equipment and transmission line faults. Over-load faults are caused by the unexpected increasing of load. Electrical equipment fault is caused by lightning, insulator breakage, product design which is out of specification and improper installations of equipment. Other than that, fault on transmission and distribution overhead line are caused by lightning, storm, fallen trees and snow.

A fault is defined as flow of a large current which could cause equipment damage [1]. A fault at any location in the distribution network has an affected to temporary interruption such as voltage drop, losses of supply and energy losses. If the current is very large, it might lead to interruption of power in the network. Then, it can affect equipment insulation when the voltage level will change. Voltage below than minimum level could cause failure of equipment. Then, fast to detect the fault can minimize the effect of fault that caused of damage transformer and cables in the power system and that can affect to power failure on affected feeder.

Two types of faults can occur on any distribution network. There are balanced fault and unbalanced fault. There also knows as symmetrical and unsymmetrical fault. Unsymmetrical fault or unbalanced fault is the most faults occur