Detection of Three Phase Transmission lines Evaluation and Position

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Abstract: After generating electricity, energy transfer in electrical engineering is an important problem. The failure of the transmission lines is normal and there is a major problem in this flow. This document presents a technique for detecting the location of various errors on a transmission line for faster and reliable operation of security schemes. Simulation MATLAB is developed to generate the basic component of transmission voltage and current. The MATLAB software simulates the high voltage transmission line, namely fault error, line- line error, double line to ground, and three different conditions of operation and error. Effects of failure resistance (Rf), failure to isolate (LF) mass variations in large volumes, current, and non-proportion of system, detection, rating, and error space mass for its relationship of logic Studied.

Keywords: Transmission line error, protection of the transmission line, detection and mapping of air defects, analysis of faults in the transmission line.

1.Introduction

The location and distance of error is a very important problem in the power system engineering, to eliminate the errors as soon as possible and with the least hindrance to restore the power as soon as possible. Required for reliable equipment and reliable operation of customer satisfaction. There are some potential errors in the three-phase transmission line, namely NG, BG, CG, AB, AC, BC, ABG, ACG, BCG, ABC and ABCG. These types of troubles are divided into five different types of troubles:
1. LG faults – AG, BG, CG
2. LL faults – AB, AC, BC
3. LLG faults – ABG,ACG, BCG
4. LLL faults – ABC
5. LLLG faults – ABCG

Due to high current due to a fault in the line impedance, the problem of defects can be easily detected with a strong reduction. The next problem is its classification, which is the type of error. Of these, five, LLL and LLLG defects are symmetric errors and can not be separated. The voltage and current values change suddenly during the fault and phase imbalance. The method requires constant inspection of line impedance values in each stage. The phase with sudden decrease in impedance indicates that the phase is faulty. Soil is included in a mistake or can not be easily separated with a zero sequence analyzer. In the event of a fault of the land, the Earth's fault is present in the current flow. In this article, a place and fault detection algorithm is proposed based on line impedance monitoring. For this purpose, 220 KV, 200 km, 50Hz transmission line is used using MATLAB BlockSat power supply.

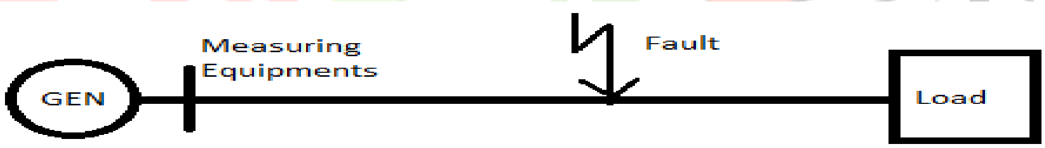


Figure 1: Simple Power System Network

2. Basic idea of the method used

The order of the relay system is described for fault resolution In Fig. 2, the voltage in each stage and the original component of the current is constantly sent in relay, which provides impedance values in each phase. When there is a mistake in the system, the impedance decreases suddenly due to the current short circuit. This change in price has been detected and faulty steps are identified by the use of relay through logic controllers. Since changing value is important and only in those steps where error arises, the identification of faulty steps becomes simpler and related steps can be separated from the system using circuit breaker. For this closing, a three-phase transmission line at 220 kV, 50Hz is simulated using MATLAB BlockSat power supply. All possible defects are simulated with various fault resistance values and situations, which provide current and impedance setpages to detect fault and identify stages. To distinguish whether the earth is involved in failure or not, we use a zero sequence analyzer which provides only an honorable value when the land is involved in failure. The simulic model is used in the FIG. 3. The three phase implies all possible errors with any angle of fault block creation. Voltage and current blocks are subsystem blocks made of all measurement devices.

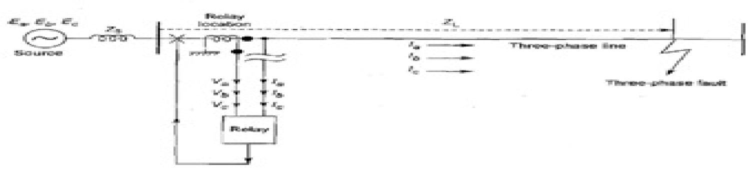


Figure 2: Single line diagram of three Phase transmission line under study

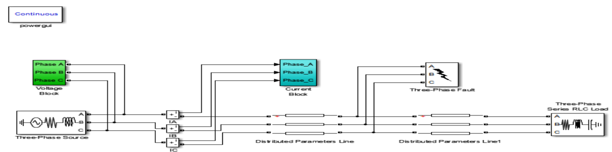


Figure 3: Power system model in Simulink under study

Impedance drops from a group of thousands to hundreds The current increases from a range of hundreds to thousands (a) Zero series current in the event of fault based fault resistance
Distance to error These values also change the changes because of the load. High load currents can be a problem for faulty site algorithms that need to be taken into account. The appropriate selection point must be specified for the correct distinction between error and overload.

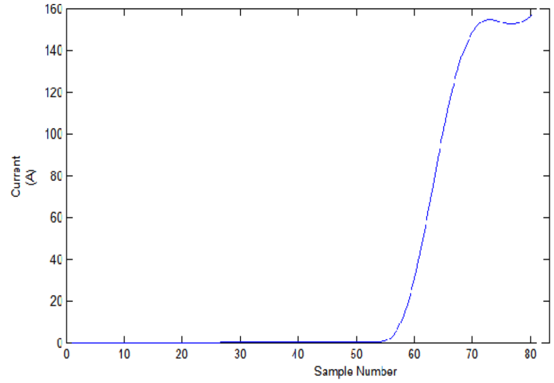
3. Algorithm

3.1 Algorithm for detecting and classifying faults

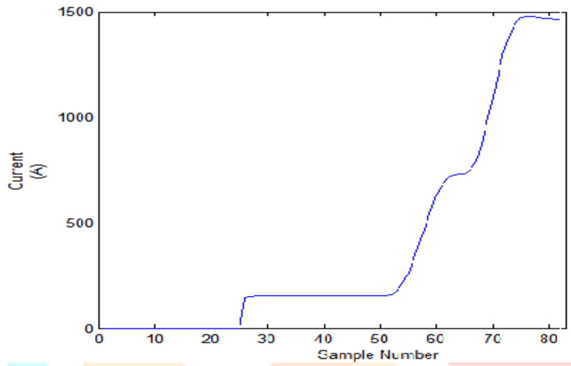
As shown in Figure 4, we have diagrams of the core values of the current in the three phases as well as the zero sequence analyzer that was simulated during the error. We find a significant rise in zero-sequence analyzer, a value in the range of 150 thousand (under normal circumstances the value is close to zero). This high value confirms that the Earth is involved in some error. The current value in phase B and C is within the normal current values (less than 160 A - 190A), so do not participate in stages B and C in the error. The current in phase A is very high and therefore is involved in the error. So the fault type is AG.
Thus, when an enormous current of more than 200A flows at any stage, it is classified as false. The mass is defective or undetermined if the current value of the homo polar sequence exceeds 35A. The specified points are for the system where the current rating at each step is 160A. The 40A difference is kept to distinguish between overload and error. These specific points can be modified in the same way as any other system. Thus, when the fault sequence is classified, the relay flight signals can be sent to the respective stages of the holiday.

3.2 Algorithm to place the fault

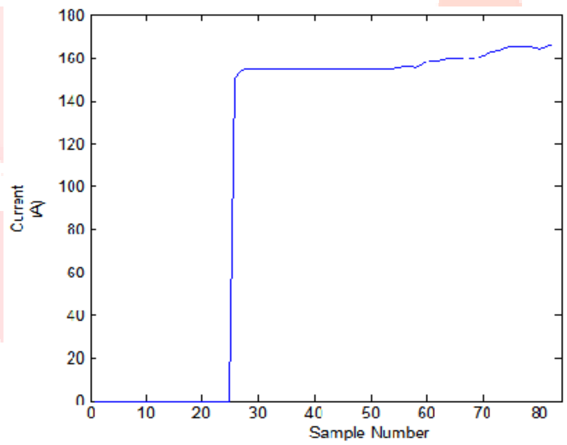
The next task is to locate the fault because we made some observations. The impedance of the line changes not only because of the damage resistance, but also because of the location of the fault. The graph obtained using Simulink by creating LG and LLG errors with different fault tolerance and location is shown in Fig.5. The graphs obtained from the simulation indicate that the impedance of the line increases with increasing fault localization and increasing the resistance to defects. We have a fault line impedance database in various fault locations and different fault tolerance values. If we accept the error and will be identified as an LG error and the line impedance measured by the relay is124 ((Example of the simulation model, the value of the plot can be indicated) Obviously, crack resistance 100 ohms or 50 ohms. To increase accuracy, measurements are also made from the remote end and the location can be adapted relative to the value of the line resistance, which will give the location of the error. This can be done using a flexible calculation method such as fuzzy logic or artificial neural network.



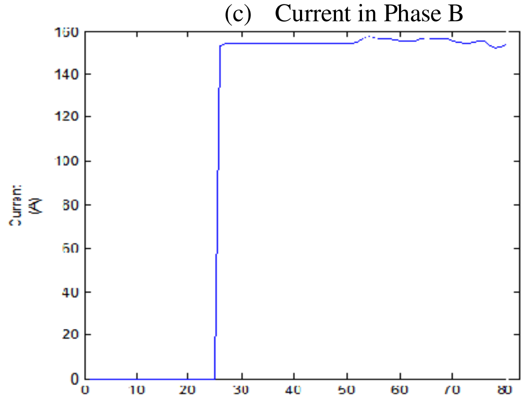
(a)Zero Sequence Current



(b) Current in phase A

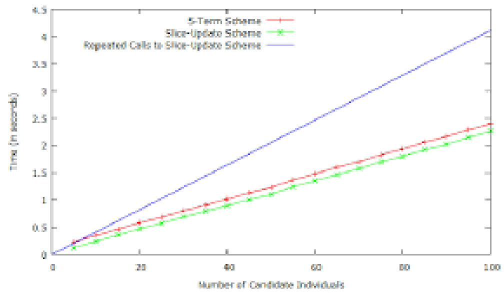


(c) Current in Phase B

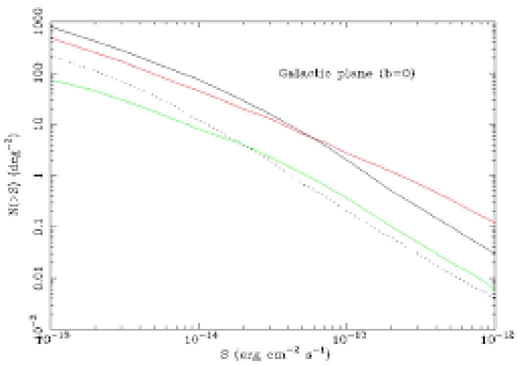


(d) Current in Phase C

Figure 4: Track the initial value of the current in all three stages and the zero sequence analyzer (from SIMULINK)



(a) Fault type: LG



(b) Fault type: LL

Figure 5: Plot for change of line impedance with change in fault position with dissimilar fault resistance (obtained from SIMULINK) for (a) LLG fault and (b) LL fault.

4.Analysis Result of the Fault Detector and Classifier

After logic, errors have been assessed by archaeologists and architects in different places and in different aspects of creation due to the type of error. In the Table I got a refugee response. For example, the formation of fault = 0.04sec (formation of 0 degree frustration) was created at the time of staying. 100 with false protest. After a mistake, every step will change. In this erring period, the importance of all the floods is indicated in the figure. 4. An error occured in T = 0.04sec, so error occurred at number 49 (49 x 0.000833sec = 0.040817sec), which is 0,000833sec = time-consuming. After the setting, 200 A is also the system to consider the error at this level. 4b) Number 54 (T = 54 x 0.000833 = 0.044982sec) has been incorrectly installed.

The timing of the operation of fault detectors and classifier based on non-proportion can be done as follows:Sample number was encountered. 49
Invalid start time = 49 x 0.000833 = 0.040817sec. Error detected on sample number 54
Error detected at time = 54 x 0.000833 = 0.044982sec.
Operation time = error detection - error start time = 0.044982-0.040817 = 0.004165 seconds
System frequency is 50 hz. It takes 0.02 seconds to complete a cycle. Accordingly, it is clear that the relay-running system is about 0.02 seconds in approximately one phase of the system.

Various errors have been revised and the test microscope based on the test and classical results of the test results are given in the table. Error detectors and classic fiber outputs should be zero for a healthy condition (error status), and it should be inevitable in its associated wrong steps. From the table it is clear that the production of the same step is high after the error.

Table 1: Test results

Fault Type Fault Phase	Location (Distance from the relay in km)	Fault inceptio-n angle (in degrees)	Fault Resist-ance in Ohms	Output of the line impedance based detector and classifier			
				Phase A	Phase B	Phase C	Ground G
No fault	-	-	-	0	0	0	0
AG	100	0	100	1	0	0	1
AB	51	90	25	1	1	0	0
ACG	152	90	100	1	0	1	1
BG	21	50	25	0	1	0	1
ABC	51	50	100	1	1	1	0

5. Conclusion

Detect-based error detection, rating and localization procedures often compare the liquid parameters in the case of a pre-defined line parameters. Using this method, using a pre-defined set of values with any soft computing technique, provides a possible location of trouble without any badge modes.

Test results indicate that the speed and selectivity of the approach are quite robust and provide adequate performance for a three phase transmission line.

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