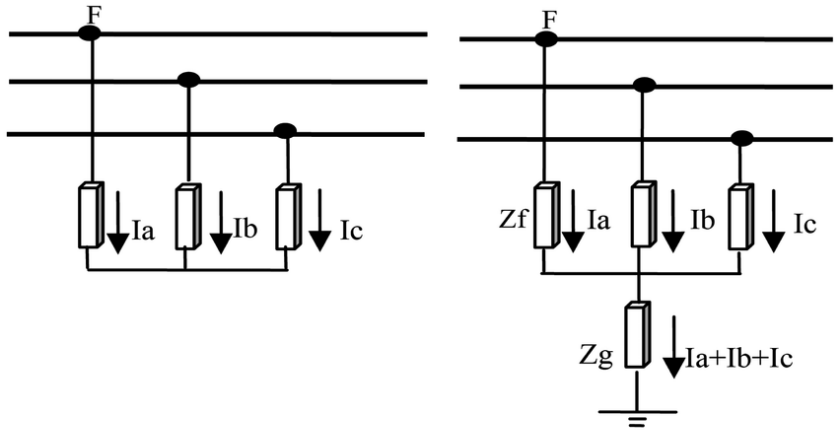
Contents

1 Fault Classification

- There are primarily open and short circuit faults
- Faults can be located using terminal fault location methods or cable screening methods
- Open Circuit fault occurs in the series of transmission line - Open Conductor Fault , 2 open conductor fault , 3 open conductor fault which causes excessive current to flow into the system
- They can be tolerated but if higher power then insulation breaks down and short circuit fault occurs
- Short Circuit Fault occurs due to insulation failure between a phase conductors and ground
- These includes
    1. Symmetrical Faults
    2. Unsymmetrical Faults

1.1 Symmetrical Faults

- Arcing due to faults can lead to fire
- Voltage can fall below permissible value



Three Phase fault

Three Phase-Ground fault

- Symmetrical Faults involves all three phases like

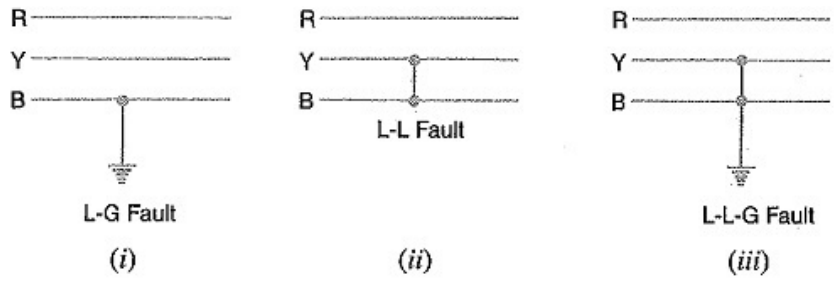
    1. L-L-L
    2. L-L-L-G

- Majority of symmetrical faults occur at generator terminals , system stays balance but electrical equipments can get severly damaged
- They are the most severe type of fault with highest fault current but they happens rarely

1.2 Unsymmetrical Faults

- These fault causes unsymmetrical current , meaning variation in phase and magnitude throughout all three phases
- These faults are more frequent faults
- They involves

    1. L-G
    2. L-L
    3. L-L-G



- In these faults conductors make contact with other conductor or with the ground or both
- L-L faults occurs mainly due to 2 lines swinging because of high speed winds
- Here the system is unbalanced because impedance level in each phase differs , causing unbalanced current to flow between the phases

2 ML Application in Fault Analysis

3 Research Papers

3.1 Integrating discrete wavelet transform with neural networks and machine learning for fault detection in microgrids

- Additional difficulties in microgrid fault detection due to distributed generation specifically the bidirectional flow of energy
- conventional systems are ineffective due to low value of fault current in MG
- Techniques of protection differs on whether the MG is connects to main grid or is working in isolation mode
- It involves generator of different capacities and types of fault current producd at various levels
- DWT extracts wavelet coefficients
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