



# SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)



COIMBATORE-35

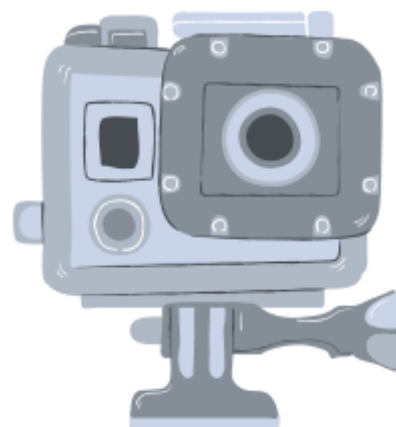
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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

UNIT 4

## Fault Analysis – Balanced Faults

19EET302 – Power System 1  
III year / V Semester





# INTRODUCTION

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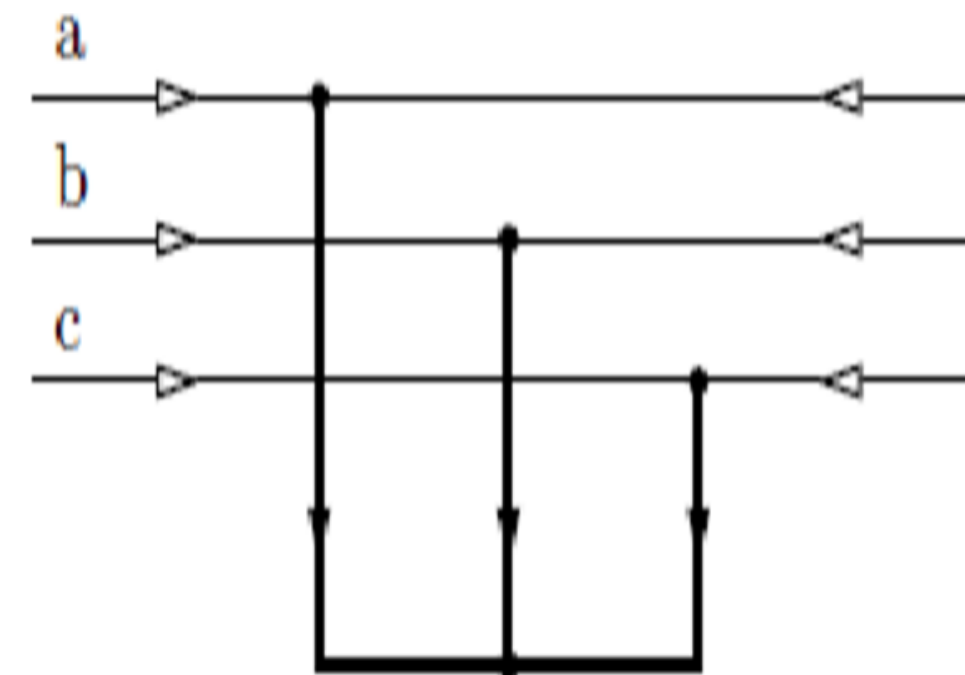
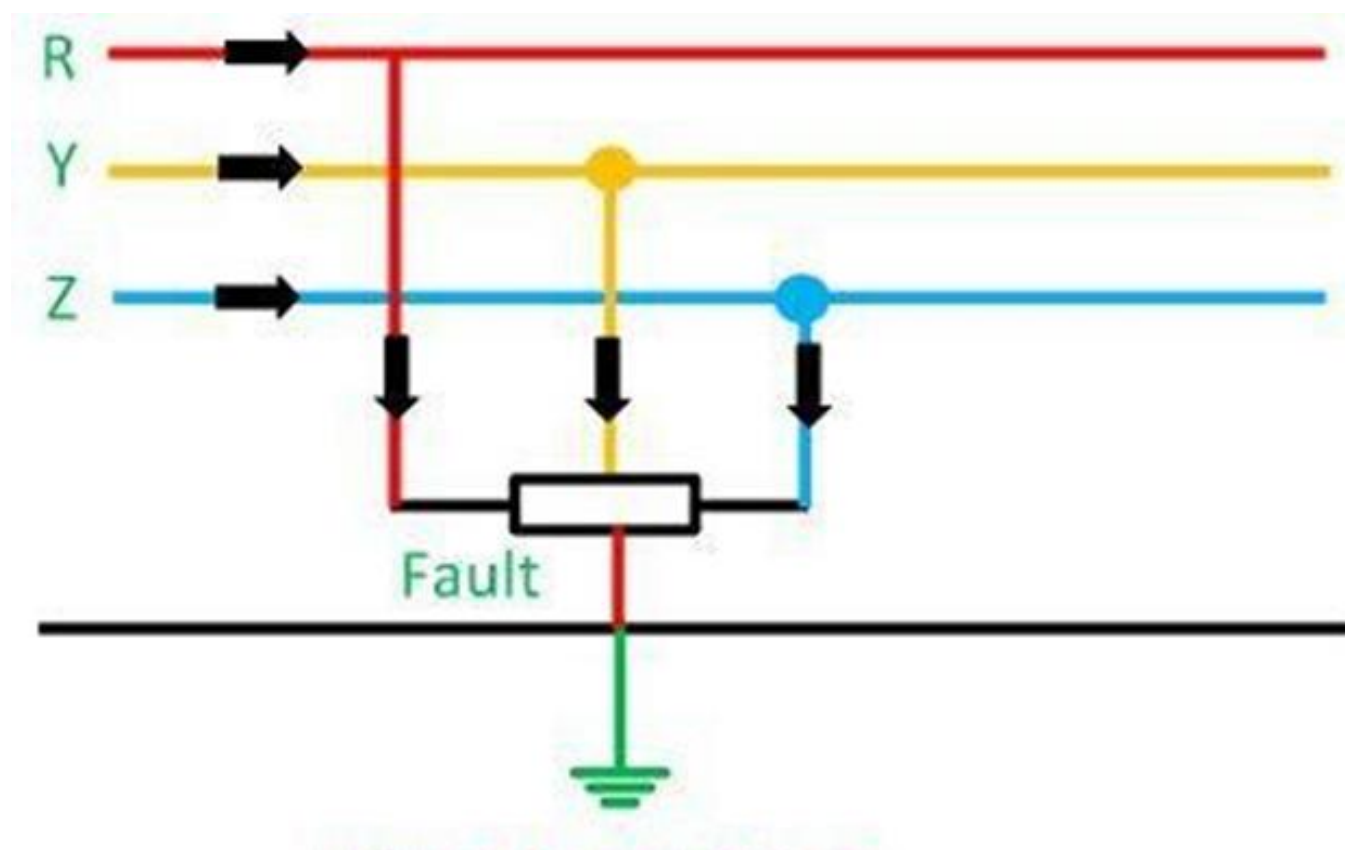
## *Fault Analysis*

Fault analysis is an essential tool for the determination of short-circuit currents that result from different fault phenomena, the estimation of fault locations, the identification of under-rated equipment in electric power systems and the sizing of various system components.



# Types of Symmetrical faults

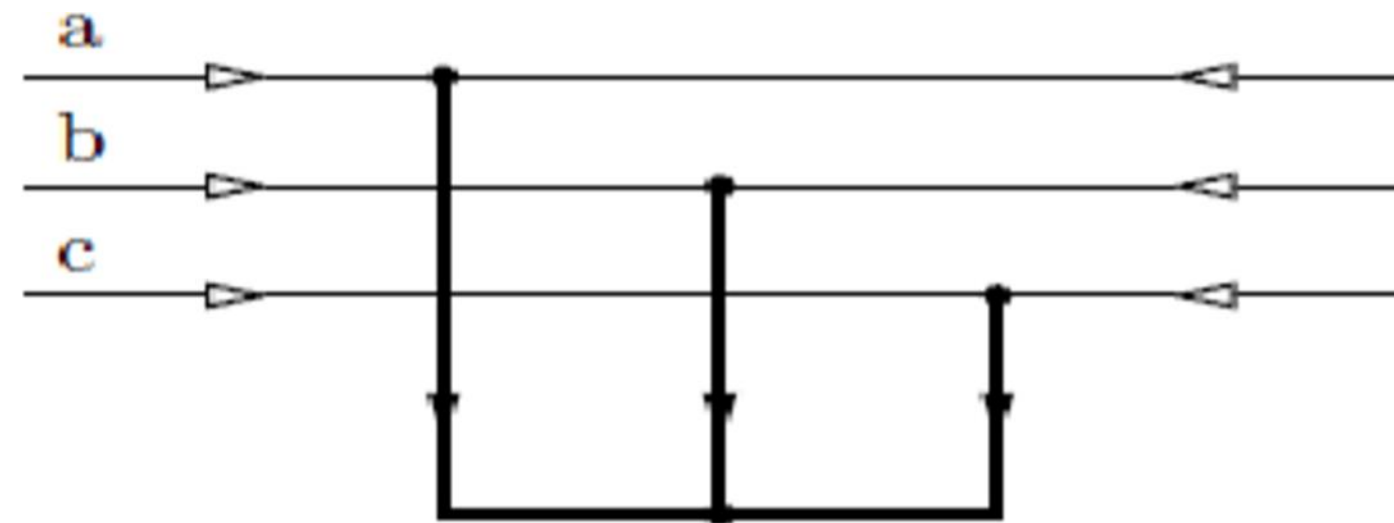
- The faults which involve all the three phases is known as the symmetrical fault. Such types of fault remain balanced even after the fault.



Line - Line - Line Fault

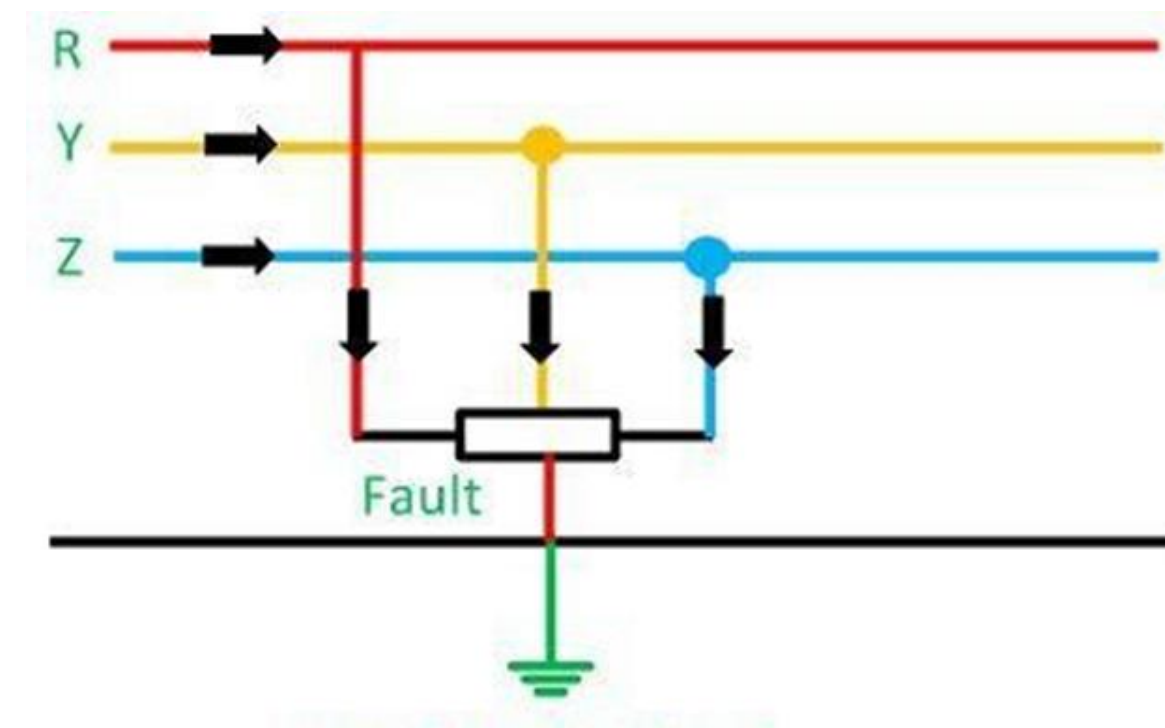


# Line – Line – Line Fault



Line – Line – Line Fault

# Three-phase line to the ground fault





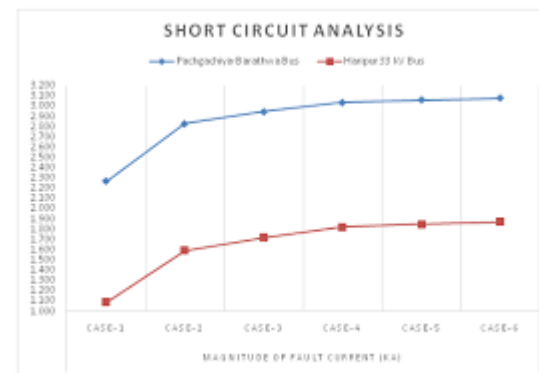
# BASIC ASSUMPTIONS IN FAULT ANALYSIS

- Representing each machine by a constant voltage source behind proper reactance which may be  $X''$ ,  $X'$ , or  $X$
- Pre-fault load current are neglected
- Transformer taps are assumed to be nominal
- Shunt elements in the transformers model that account for magnetizing current and core loss are neglected
- A symmetric three phase power system is conducted
- Shunt capacitance and series resistance in transmission are neglected
- The negative sequence impedances of alternators are assumed to be the same as their positive sequence impedance  $Z_+ = Z_-$



# Need for fault analysis

- Short circuit studies are essential in order to design or develop the protective schemes for various parts of the system. To estimate the magnitude of fault current for the proper choice of circuit breaker and protective relays.



Estimate - magnitude of fault



Oil-Based Circuit Breaker      Air Circuit Breakers

Choice of circuit breaker



Choice of protective relays



# Summary

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## Activity



**KEEP  
LEARNING..  
Thank u**

SEE YOU IN NEXT CLASS