



# SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)



COIMBATORE-35

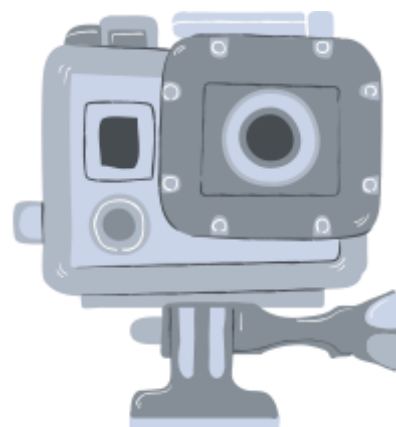
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DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

UNIT 4

## Fault Analysis – Balanced Faults

19EET302 – Power System 1  
III year / V Semester





# BASIC ASSUMPTIONS IN FAULT ANALYSIS OF POWER SYSTEMS

## *Fault Analysis*



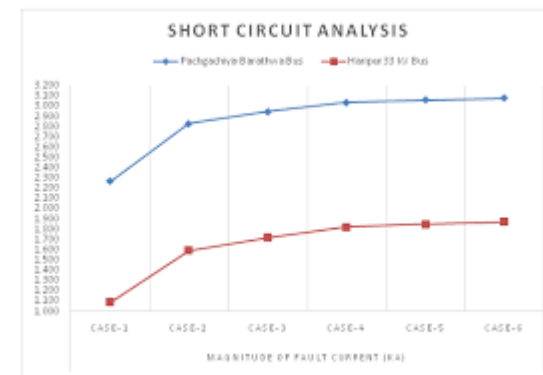
# Basic Assumptions

- 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



Choice of circuit breaker



Choice of protective relays



# Basic of Fault

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## **Bolted fault or solid fault**

A Fault represents a structural network change equivalent with that caused by the addition of impedance at the place of a fault. If the fault impedance is zero, the fault is referred as bolted fault or solid fault.

## **Reason for transients during short circuits**

The faults or short circuits are associated with sudden change in currents. Most of the components of the power system have inductive property which opposes any sudden change in currents, so the faults are associated with transients.

## **Doubling effect**

If a symmetrical fault occurs when the voltage wave is going through zero then the maximum momentary short circuit current will be double the value of maximum symmetrical short circuit current. This effect is called doubling effect.



# Summary

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## Activity



**KEEP  
LEARNING..  
Thank u**

SEE YOU IN NEXT CLASS