DIRECTIONAL OVER CURRENT RELAY PAIR
IDENTIFICATION IN A CASCADED 6 - BUS NETWORK

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ABSTRACT

This technical paper presents for the concept of a relay coordination technique using LINKNET structure. It is very critical to get set pair to operate as per the time duration using mechanical parameters like circuit breaker, isolator, current transformer and some protection equipment. LINKNET Algorithm is developed to use for the coordination of backup/primary relays. The LINKNET structure consists of three vectors like a LIST, NEXT, & FAR to store network topology information using relay numbers. Basically this paper present for the simplifying process to get coordinates of back/primary relay settings.

Keyword: - *Backup/Primary (B/P), LINKNET, NEXT, LIST, FAR, algorithm, pair network, bus etc….*

Nomenclature: - i   Fault Location or Relay Number
j   Number Of Branch Ends Of The System
k & l   Position Number In A Vector
a   Branch Number
TMS   Time Multiplier Setting
Ip   Pick Up Current Setting
n   Number Of Bus System

1. INTRODUCTION

Modern power transmission systems are interconnected and having complex loops. For such a system it very difficult to decide the set of backup primary relays, their sequence of operations, and their setting about relays for possible faults in a power system. The LINKNET structure is used to represent and store the network topology and helps in scanning the network using algorithms vectors like a far, next, list etc. basically it is very important tool for setting of relay coordination.
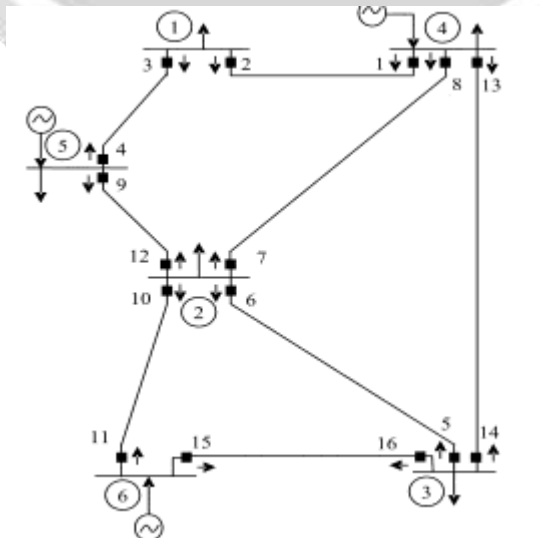
2. BUS-6 NETWORK

Figure 1: 6-Bus Network in a Power System

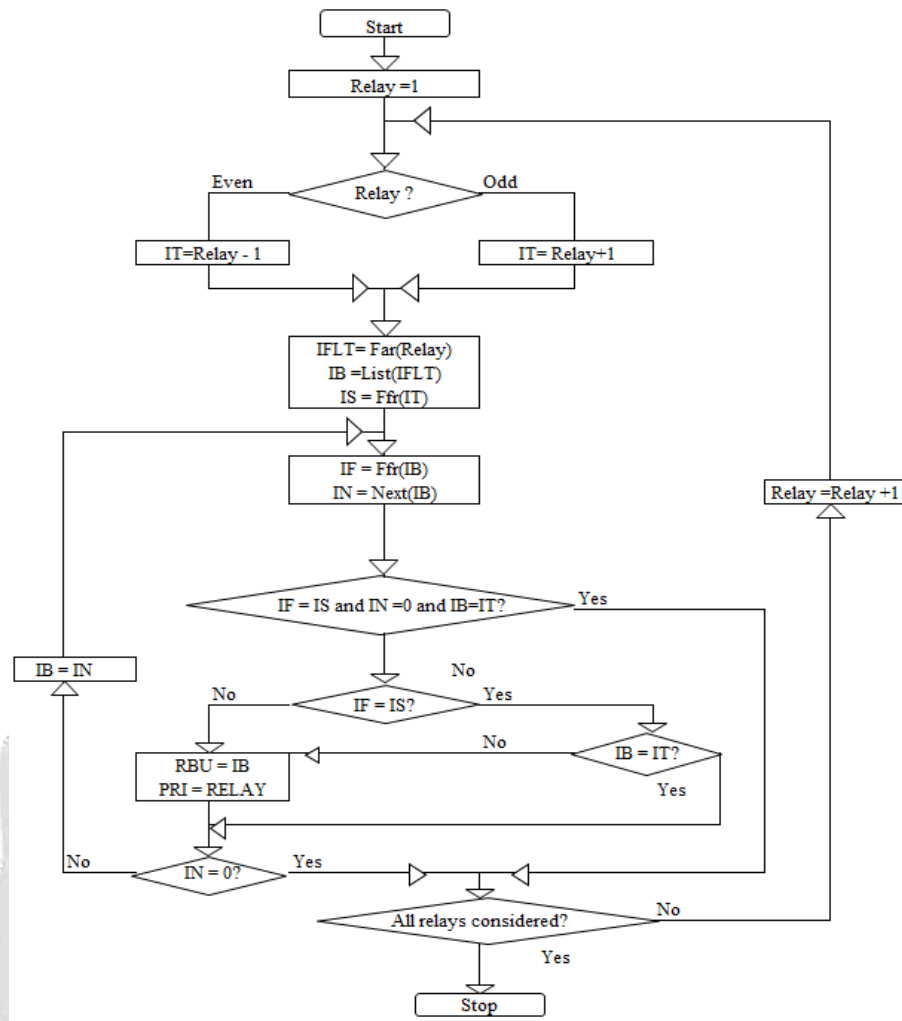## 3. ALGORITHM FOR SELECTION TO RELAY PAIRS

Figure 2: Primary/Backup pair flow chart

Following are the different variables used to locate relay positions.

IT = Relay at the other end
IFLT= Bus number near which the relay under consideration is located
IB = Directional relay looking towards IFLT bus
IS = Bus on which opposite end relay is placed
IF = Bus near which backup relay is placed
IN = Next directional relay incident at bus IFLT

The steps of algorithm takes place as following:

- ❖ Initially, the relay considered as odd or even.
- ❖ Afterward, IFLT (the bus number near which the relay under consideration is located), IB (first directional relay looking towards this bus), and IS (bus near which opposite end relay is placed) are obtained.
- ❖ Subsequently, IF (bus near which the backup relay to the relay under consideration is placed) and IN (the next directional relay incident at bus IFLT) are calculated.
- ❖ After two/three decision logic blocks, primary/backup relay pairs are found out.
- ❖ Once the primary/backup relay pairs are obtained, the next step is to determine the PS (pickup current) and TDSs of all the relays.
- ❖ The algorithm is applicable to any network which may be radial, ring mains, cascaded parallel feeder or an interconnected power system with any number of lines parallel or otherwise

4. RESULT AND RELAY PAIR LOCATIONS:

TABLE: 1 BACK UP RELAY FOR FAULT LOCATION IN 6-BUS NETWORK

Fault Location Number	Back Up Relay For Close In Fault In 6-Bus System
1	7,14
2	4
3	12
4	1
5	13,15
6	8,9,11
7	14,2
8	9,11,5
9	3
10	11,8,5
11	16
12	9,8,5
13	7,2
14	15,6
15	10
6	13,6

5. CONCLUSIONS

This Paper Presented For Identification Or Location Of The Relay Using LINKNET Structure Or Algorithms. It Is Very Important Tool To Get Clear Idea For Location Of Relay Correct Simulation. The Paper Highlights Structural Direction Of The Current Flowing During Fault And Its Algorithm Is Important For Future Various Bus Networks.

6. REFERENCES

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8. BIOGRAPHIES

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