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Short Circuit Analysis Using MI Power Software

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Abstract: In this undertaking we have clarified about the exhibition of IEEE-6 transport framework by utilizing Mi power innovation. In the past venture the heap stream investigation and soundness examination was found by utilizing Mi power programming. This venture shows the short out examination by utilizing MI power innovation. The greatest and least genuine and receptive force limits have been set and the outcomes are acquired. The yield result was discovered more proficient contrasted with the past model. All the force framework gears were intended to withstand high proficiency and to withstand most pessimistic scenario condition. The MI power programming is the cutting-edge innovation so as to improve the heap stream investigation, steadiness examination, short out and possibility investigation. This venture clarifies about the MI power programming to which it raises the efficiencies for the estimation of short out examination. This venture clarifies about the distinctive shortcoming conditions, for example, balanced and unsymmetrical issue investigation in which we are thinking about the short out examination. The transient and sub transient parts are to be found and the framework prompts the steady condition.

Keywords: Mi power, short circuit analysis, symmetrical and unsymmetrical analysis**.**

I. INTRODUCTION

The electrical energy is created at producing stations, and through the transmission organization, it is communicated to the buyers. Between the creating stations and the dispersion stations, three distinct degrees of voltage (transmission, sub-transmission and circulation level of voltage) are utilized. The high voltage is needed for significant distance transmission and, the low voltage is needed for utility purposes. The voltage level is continuing diminishing from the transmission framework to the conveyance framework. The electrical energy is created by the three-stage simultaneous generator (alternators) as appeared in the figure underneath. The age voltage is normally 11kV and 33 KV. This voltage is excessively low for transmission over significant distance. It is, in this way, ventured up to 132, 220, 400 KV, or more by venture up Transformer. At that voltage, the electrical energy is sent to the mass force substation where energy is provided from a few force substations. The voltage at these substations is ventured down to 66KV and took care of to the sub-transmission framework for ahead transmission to the appropriation sub-stations. These substations are situated in the area of the heap communities. The voltage is additionally ventured down to 33KV and 11KV. The huge mechanical purchasers are provided at the essential dissemination level of 33KV while the more modest modern buyer is provided at 11KV. The voltage is ventured down further by a conveyance transformer situated in the private and business region, where it is provided to these buyers at the optional dissemination level of 400V three stage and 230V single stage.

II. EXISTING SYSTEM

In this existing system IEEE 3 bus system has been used. There are characterized into three kinds to be specific burden transport, generator transport or voltage-controlled transport, slack transport or swing transport. The genuine and responsive force esteems set to be a generator, load. Gauss-siedel strategy for load stream investigation has been utilized. It is an iterative technique utilized for explaining set of nonlinear arithmetical conditions. The underlying gauss esteem is supplanted by a determined worth. The cycle is then rehashed until the emphasis arrangement joins. The union is very touchy to the beginning qualities expected

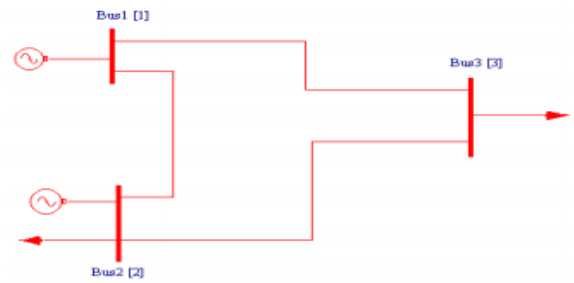

Fig 1 Block diagram

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III. PROPOSED SYSTEM

This Project represents a short circuit and contingency analysis for IEEE 6 bus system using Mi Power software. Fault analysis is an important part of power system analysis. Short circuit studies are performed to determine bus voltage and current flowing in the lines during various types of faults.
Fault are classified as follows:

- Symmetrical or balanced faults
- Unsymmetrical or unbalanced faults

This project analysis to be a unsymmetrical fault,

- Three phases to ground fault
- Single phase to ground fault

Fault Created at Bus Number 5 of the three phases to ground fault.
An issue is any unusual condition in a force framework. The consistent state working method of a force framework is adjusted 3-stage a.c. Notwithstanding, because of unexpected outside or inward changes in the framework, this condition is upset.

At the point when the protection of the framework fizzles at least one focuses or a leading article comes into contact with a live point, a short out or an issue happens.

IV. BLOCK DIAGRAM

In this paper we have using ieee 6 bus system and two winding transformers also used on this paper. Five transmission line are used. Fault created at bus number 5. In any aspect of the circuit, the voltage drop brought about by current of a specific grouping relies upon the impedance of that aspect of the circuit to current of that arrangement. The impedance of any part of a fair organization to current of one grouping might be unique in relation to impedance to current of another arrangement. The impedance of a circuit when positive grouping flows are streaming is called impedance, when just negative succession ebbs and flows are streaming the impedance is named as negative arrangement impedance. With just zero arrangement flows streaming the impedance is named as zero succession impedance. The examination of unsymmetrical shortcomings in power frameworks is completed by finding the balanced parts of the unequal flows. Since each succession current causes a voltage drop of that grouping just, each arrangement current can be considered to stream in an autonomous organization made out of impedances to current of that arrangement as it were. The single-stage equal circuit made out of the impedances to current of any one grouping just is known as the arrangement organization of that specific succession. The succession networks contain the created emfs and impedances of like grouping. Subsequently, for each force framework we can shape three-succession network s. These succession organizations, conveying current Ia1, Ia2 and Ia0 are then between associated with speak to the distinctive shortcoming conditions.

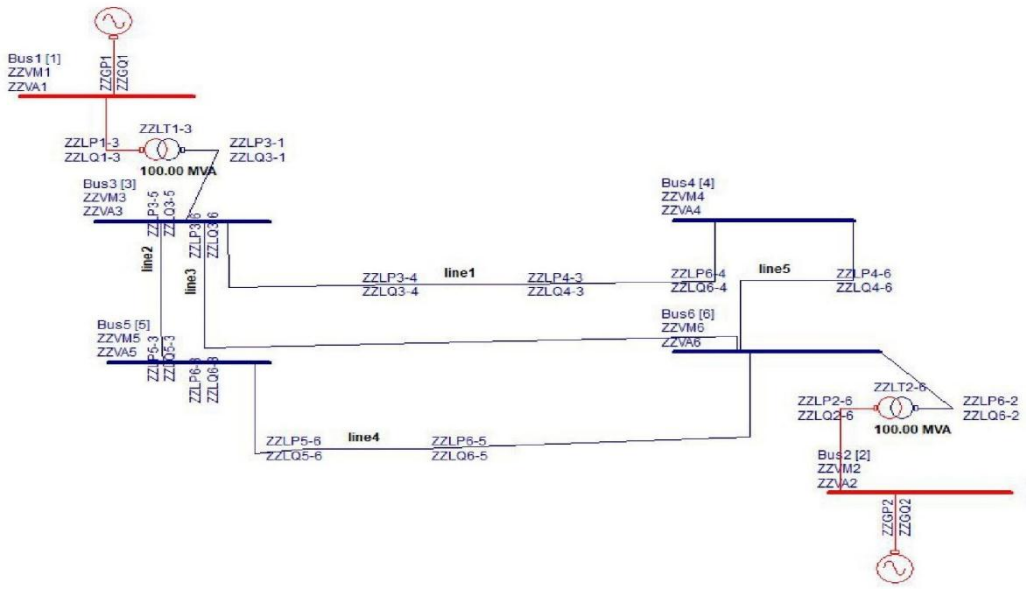

Fig 2 Block diagram

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A. Positive Sequence Network:

The created voltages of a simultaneous machine are of positive grouping just since the windings of a coordinated machine are even. The positive arrangement network comprises of an emf equivalent to no heap terminal voltages and is in arrangement with the positive grouping impedance Z1 of the machine. Fig.2 (b) and fig.2(c) shows the ways for positive arrangement flows and positive grouping network separately on a solitary stage premise in the simultaneous machine. The unbiased impedance Zn doesn't show up in the circuit in light of the fact that the phasor total of Ia1, Ib1 and Ic1 is zero and no certain succession current can move through Zn. Since its a reasonable circuit, the positive grouping. The reference transport for the positive arrangement network is the nonpartisan of the generator.

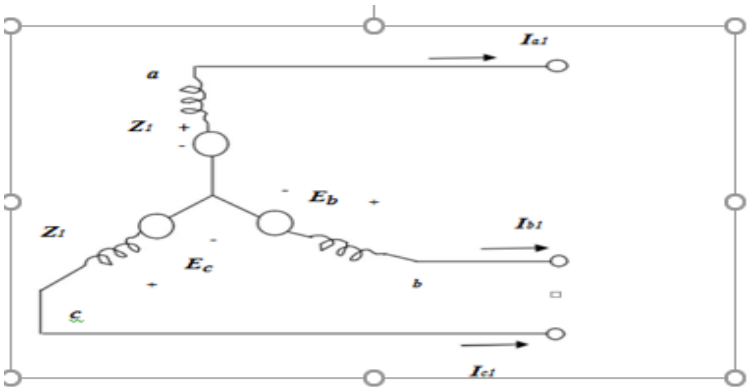

Fig 3 Positive Sequence Network

B. Negative Sequence Network:

A coordinated machine doesn't create any negative arrangement voltage. The progression of negative arrangement flows in the stator windings makes a mmf which turns at simultaneous speed toward a path inverse to the course of rotor, i.e., at double the coordinated speed concerning rotor. Hence the negative arrangement mmf substitutes past the direct and quadrature pivot and sets up a fluctuating armature response impact. Accordingly, the negative grouping reactance is taken as the normal of direct pivot and quadrature hub sub-transient reactance, i.e., It not important to consider any time variety of X2 during transient conditions on the grounds that there is no ordinary steady armature response to be affected. For more precise computations, the negative arrangement obstruction ought to be considered to represent power scattered in the rotor shafts

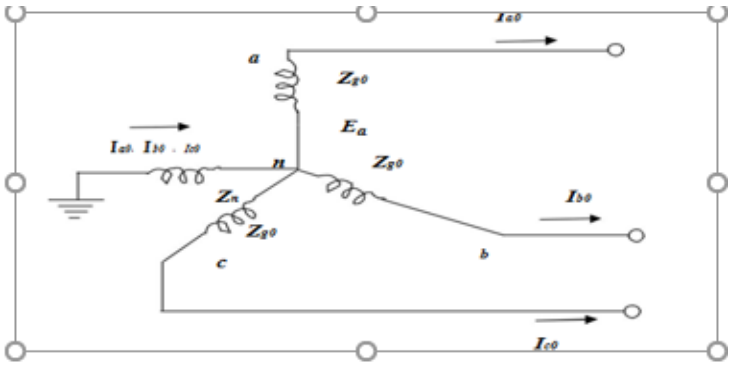

Fig 4 Negative Sequence Network

C. Zero Sequence Network:

No zero-grouping voltage is actuated in a simultaneous machine. The progression of zero grouping flows in the stator windings produces three mmf which are in time stage. In the event that each stage winding created a sinusoidal space mmf, at that point with the rotor eliminated, the transition at a point on the pivot of the stator because of zero grouping current would be zero at each moment. At the point when the transition noticeable all around hole or the spillage motion around spaces or end associations is thought of, no reason for these districts is equidistant from all the three – stage windings of the stator. The mmf created by a stage twisting withdraws from a sine wave, by sums which rely on the course of action of the winding. The zero succession flows course through the nonpartisan impedance Zn and the current moving through this impedance is 3Ia0.

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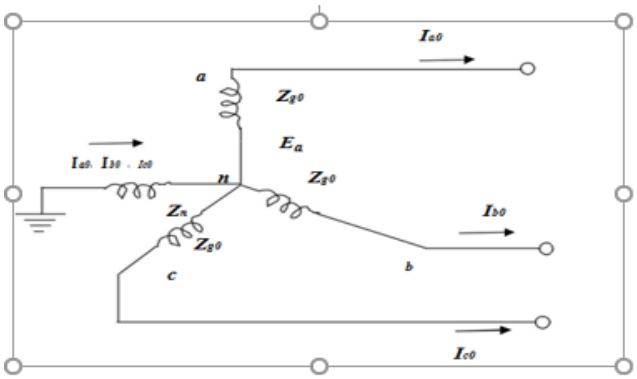

Fig 5 Zero Sequence Network

V. CONTINGENCY ANALYSIS

During a transmission line possibility both the dynamic force stream limit and the receptive force limit which specifically influences the transport voltage gets adjusted, subsequently it is basic to foresee these force stream and the transport voltages following a possibility. This section basically talks about on the different strategies for displaying possibility examination. The possibility investigation by the utilization of affectability factors has been talked about. Further the utilization of AC power stream for possibility examination has been introduced in detail. The calculation for possibility examination utilizing Fast Decoupled Load Flow has been created with the principle center around playing out the possibility determination for line possibilities for different test transport frameworks have been talked about completely.

A. Modelling of Contingency Analysis:

Since possibility examination includes the recreation of every possibility on the base case model of the force framework, three significant troubles are engaged with this investigation. First is the trouble to build up the fitting force framework model. Second is the decision of which possibility case to consider and third is the trouble in processing the force stream and transport voltages which prompts gigantic time utilization in the Energy Management System. It is along these lines adept to isolate the on-line possibility examination into three unique stages specifically possibility definition, choice and assessment. Possibility definition includes the arrangement of potential possibilities that may happen in a force framework, it includes the way toward making the possibility list. Possibility choice is a cycle of recognizing the most serious possibilities from the possibility list that prompts limit infringement in the force stream and transport voltage extent, consequently this cycle wipes out the most un-extreme possibilities and abbreviates the possibility list. It utilizes a type of file computations which demonstrates the seriousness of possibilities. Based on the consequences of these list figuring's the possibility cases are positioned. Possibility assessment is then done which includes the vital security activities or important control to work so as to relieve the impact of possibility.

B. Contingency Analysis Using AC Power Flow:

The figurings made with the assistance of organization affectability factors for possibility investigation are quicker, yet there are many force frameworks where voltage extents are the basic factor in surveying possibilities. The technique gives fast investigation of the MW streams in the framework, yet can't give data about MVAR streams and transport voltages. In frameworks where VAR streams prevail, for example, underground links, an investigation of just the MW streams won't be satisfactory to show over-burdens. Subsequently the strategy for possibility examination utilizing AC power stream is favored as it gives the data about MVAR streams and transport voltages in the framework. At the point when AC power stream is to be utilized to concentrate every possibility case, the speed of answer for assessing the MW and MVAR streams for the possibility cases are significant, if the arrangement of post possibility state arrives behind schedule, the reason for possibility investigation comes up short. The technique utilizing AC power stream will decide the over-burdens and voltage limit infringement precisely. It endures a downside, that the time such a program takes to execute may be excessively long. On the off chance that the rundown of blackouts has a few thousand sections, at that point the complete opportunity to test for the entirety of the blackouts can be excessively long. In any case, the AC power stream program for possibility investigation by the Fast Decoupled Power Flow (FDLF) [9] gives a quick answer for the possibility examination since it has the upside of grid change recipe that can be consolidated and can be utilized to reproduce the issue of possibilities including transmission line blackouts without re reversing the framework Jacobian network for all cycles. Thus, to display the possibility examination issue the AC power stream strategy, utilizing FDLF technique has been broadly picked.

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VI TABULATION

Bus Code p-q	Impedence Zpq	Line Charging Y' pq/2
3-4	0.00+j0.15	0
3-5	0.00+j0.10	0
3-6	0.00+j0.20	0
5-6	0.00+j0.15	0
4-6	0.00+j0.10	0

VII OUTPUT

Three phase to ground fault:

|*****BUS FAULT SUMMARY*****|

Bus Number	Bus Name	Rated Voltage(kV)	MVA	LLLG | Current(kA)
BUS.5	Bus5	110.000	1324.831	6.954

%----------%

%----------%

Single phase to ground fault:

|*****BUS FAULT SUMMARY*****|

Bus Number	Bus Name	Rated Voltage(kV)	MVA	SLG | Current(kA)
BUS.5	Bus5	110.000	2206.406	11.581

%----------%

%----------%

VIII RESULTS & CONCLUSION

This project represents the short circuit analysis and contingency analysis for the IEEE 6 bus system by using Mi power software in which the transient and sub transient reactance's of the components in a system are monitored and the stability of the system has been improved. The sequence impedances are considered and the system has been designed accordingly to improve the performance. Hence the project concludes "the performance of the IEEE-6 bus system" by implementing the calculation of short circuit analysis and contingency analysis for improving by considering the stability criteria to maintain the system as a stable system.

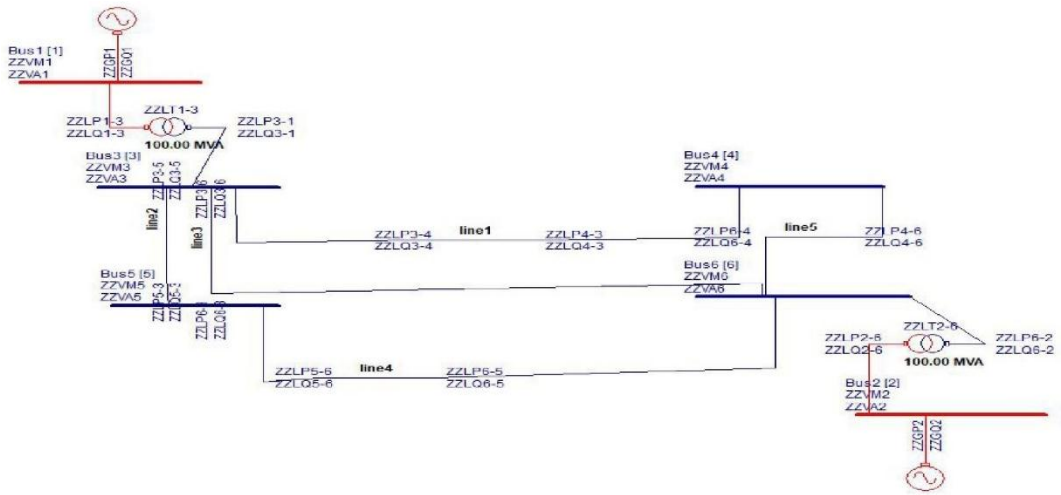

Fig 6 Input

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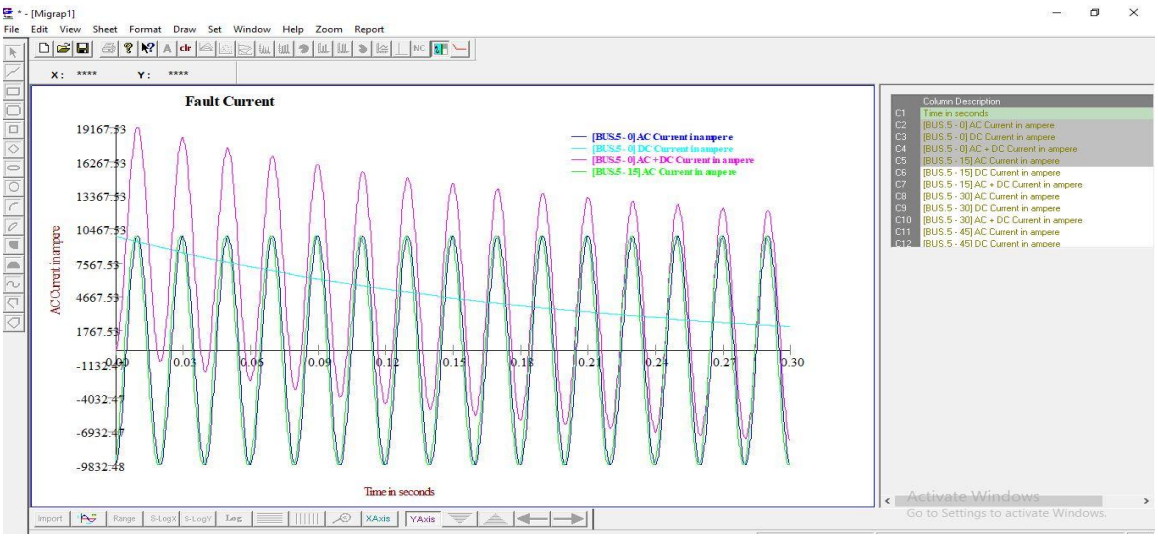

Fig 7 Output

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