Eastern Regional
Power Committee

14 Golf Club Road, Tollygunge,
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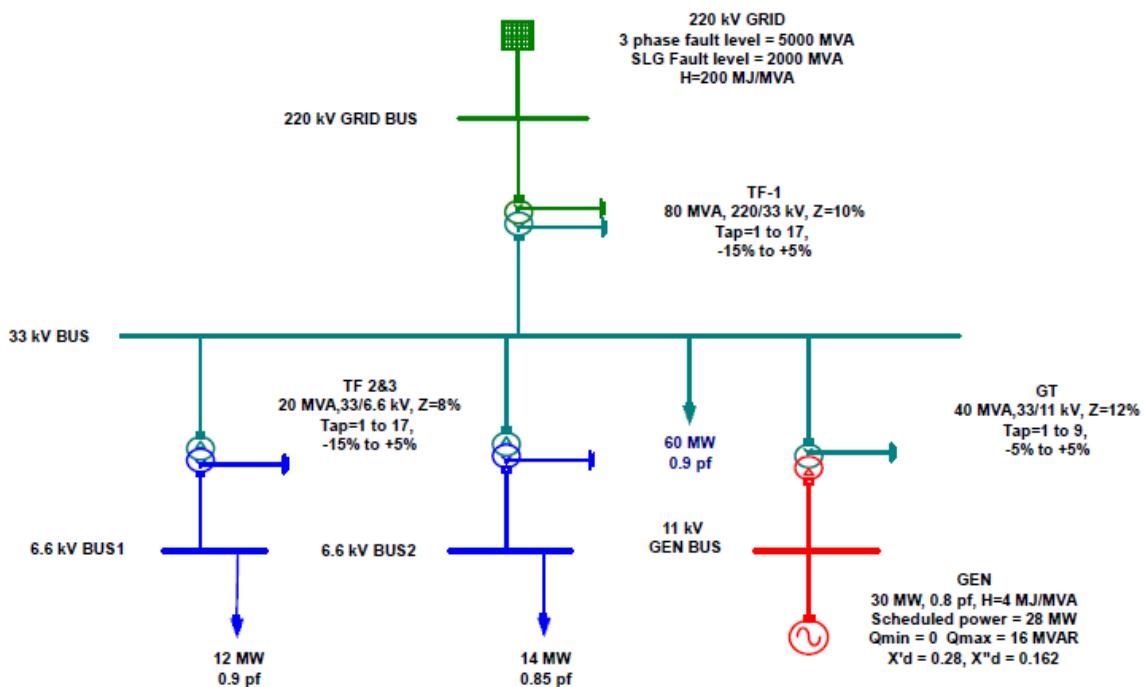
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MiP-PSCT Training Solution Sheet

Date of Assignment: 16/08/2017

1. Problem definition:

An industrial system is shown below
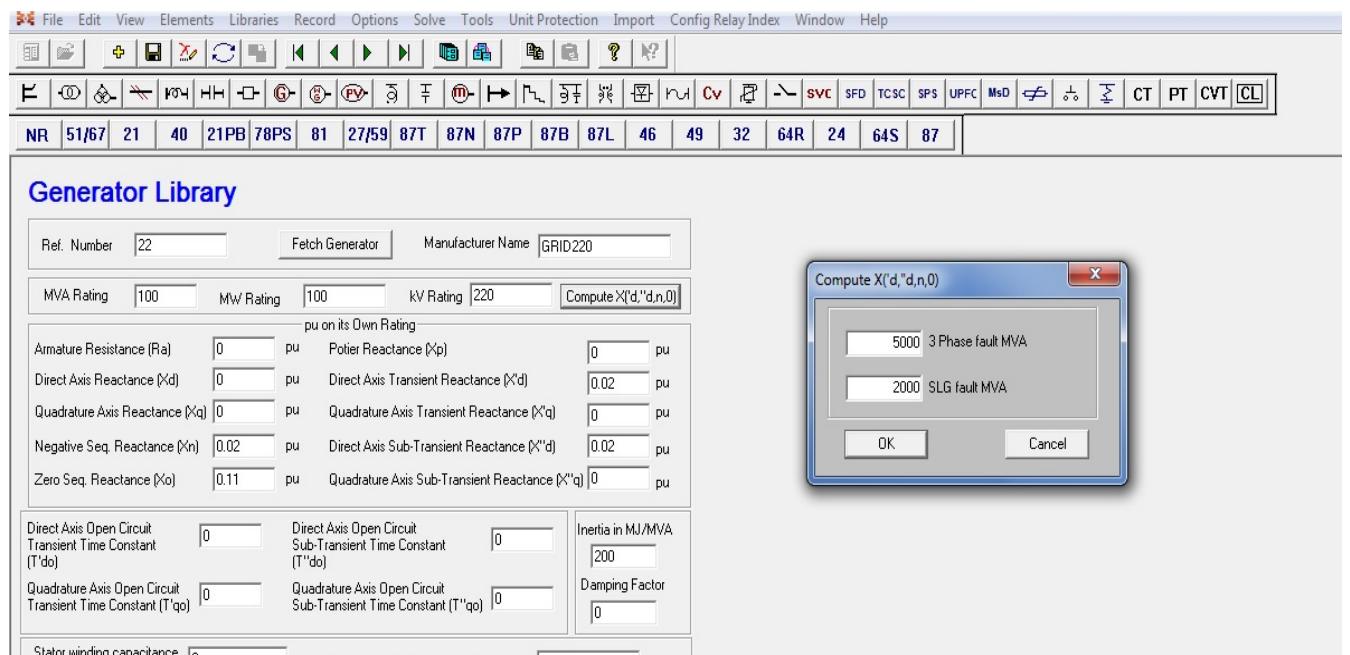
A. Find the critical clearing time of the generator for a LLLG fault at 33 kV Bus.

B. Trip the 60 MW load & grid, then observe the system behavior.

Answer: A. 0.34 seconds.
   B. When we disconnect 60 MW load and the grid, the system becomes unstable.
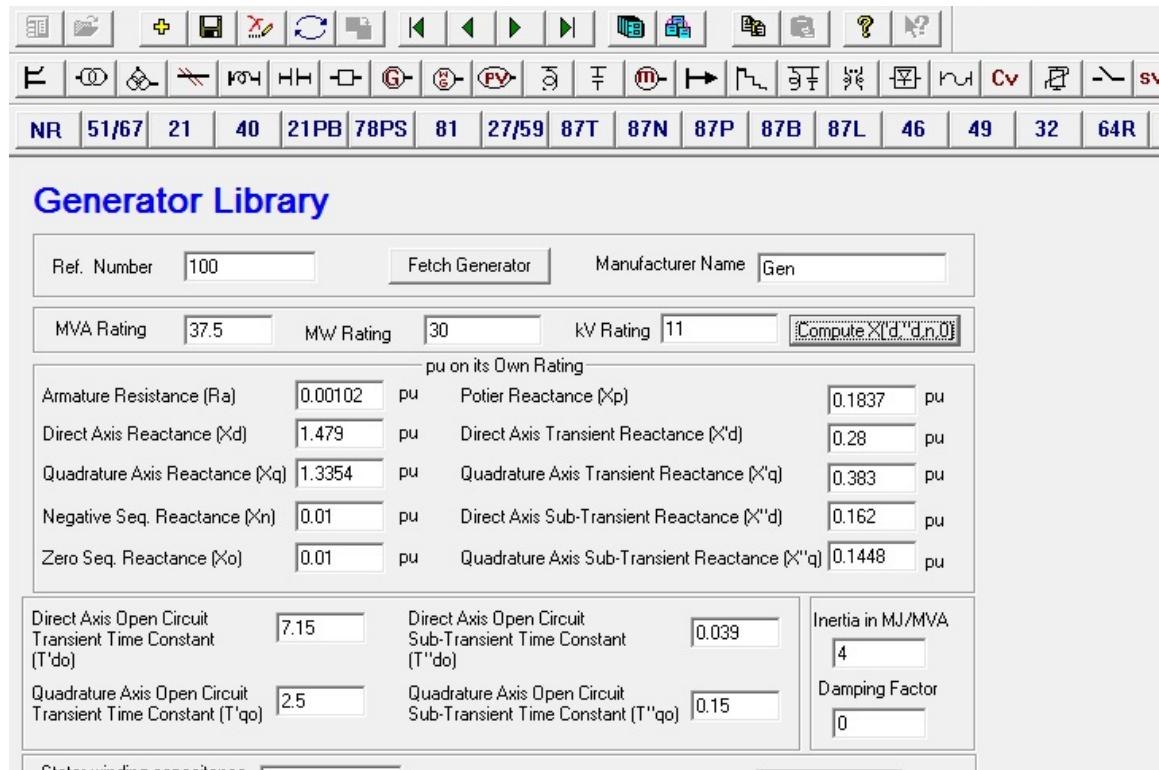
Libraries

GRID 220 kV:
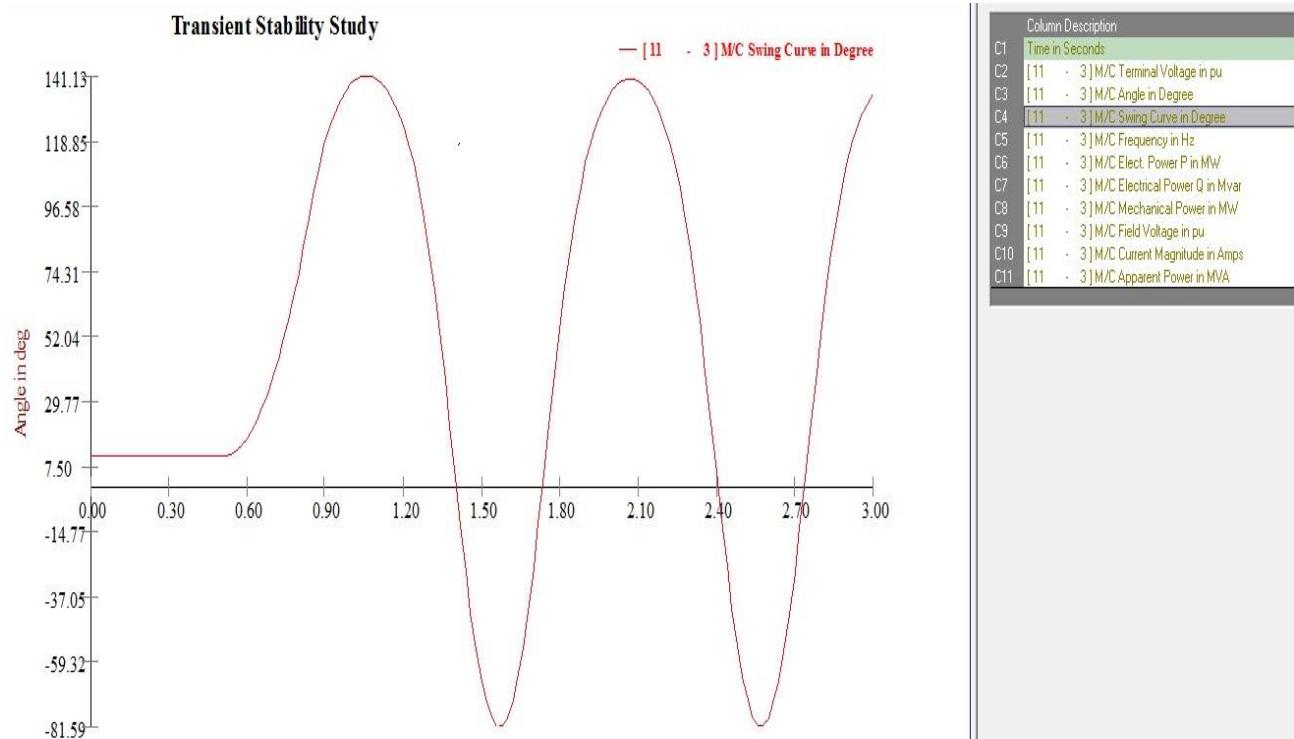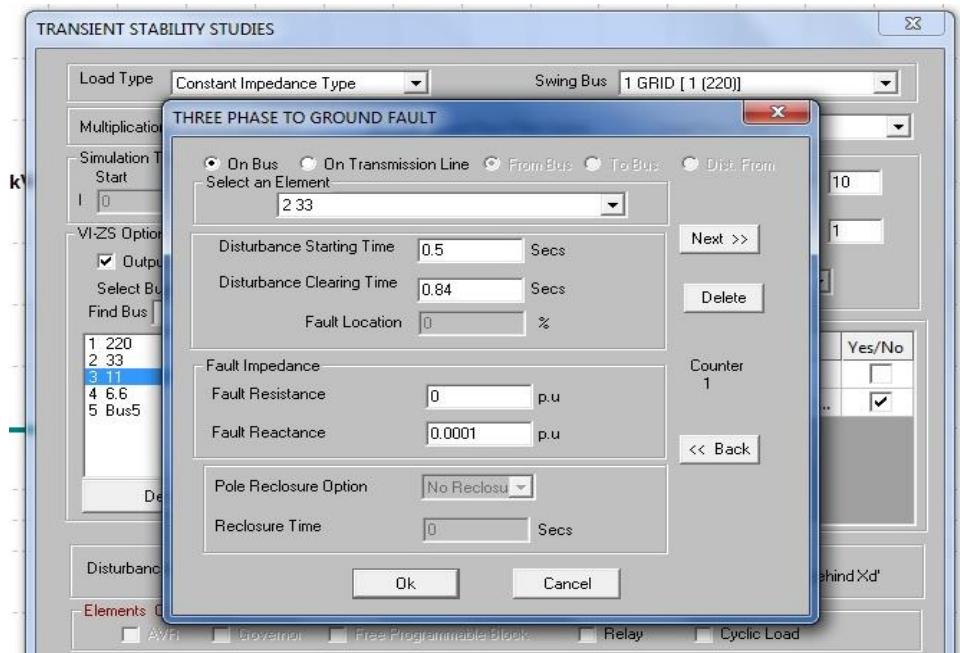
GEN 11 kV:
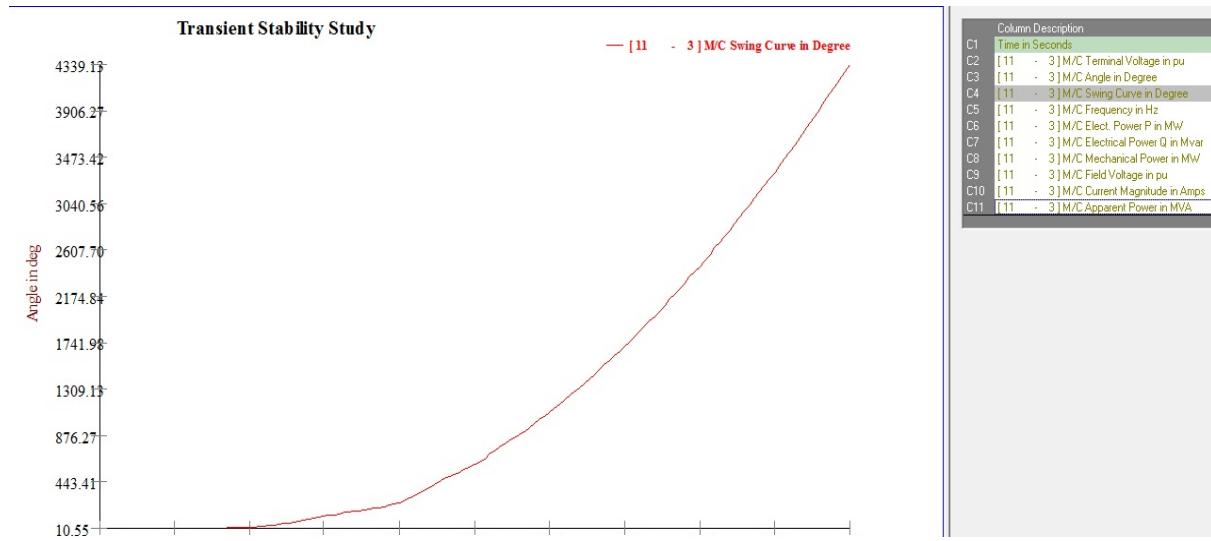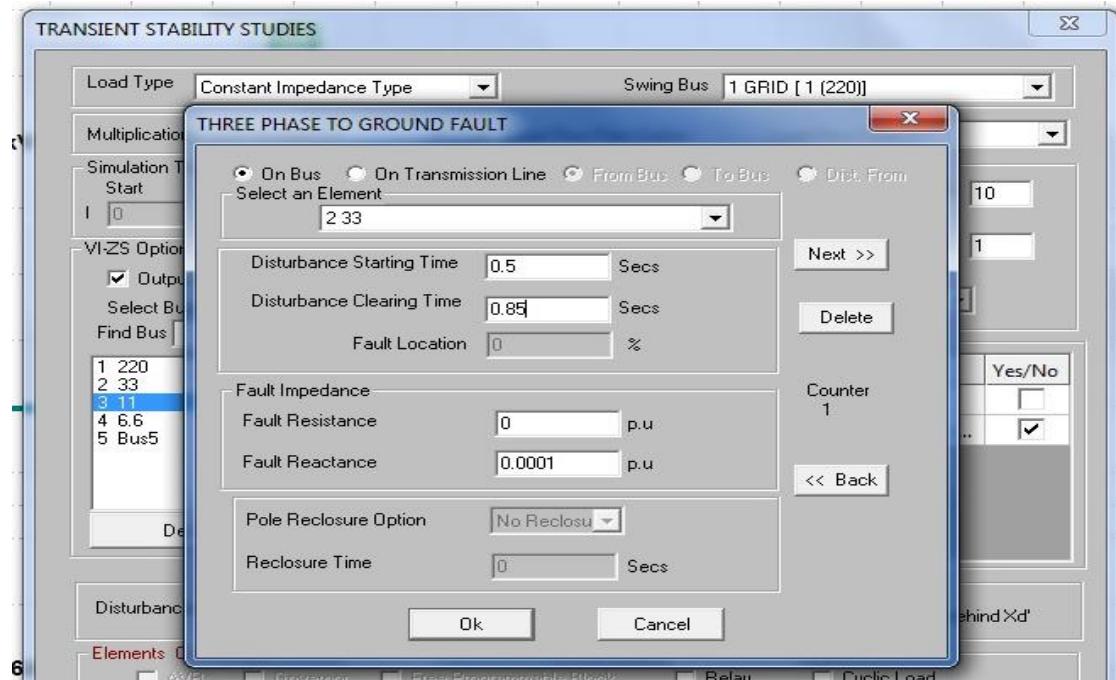
Case A:
Stable Condition:
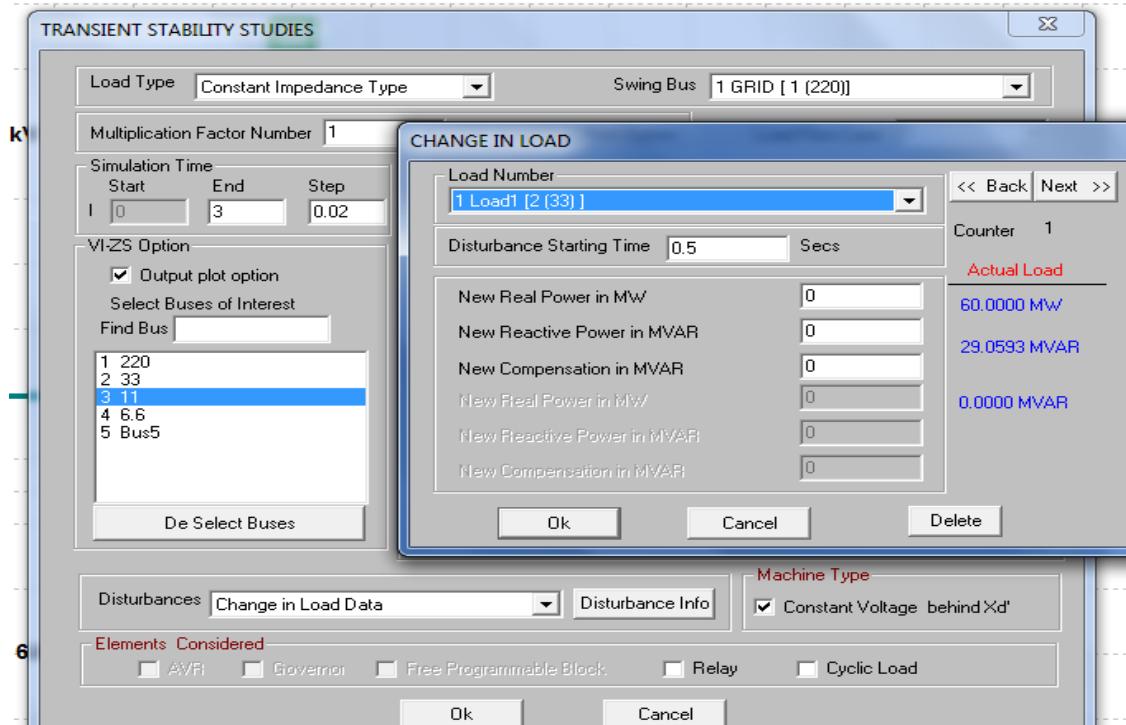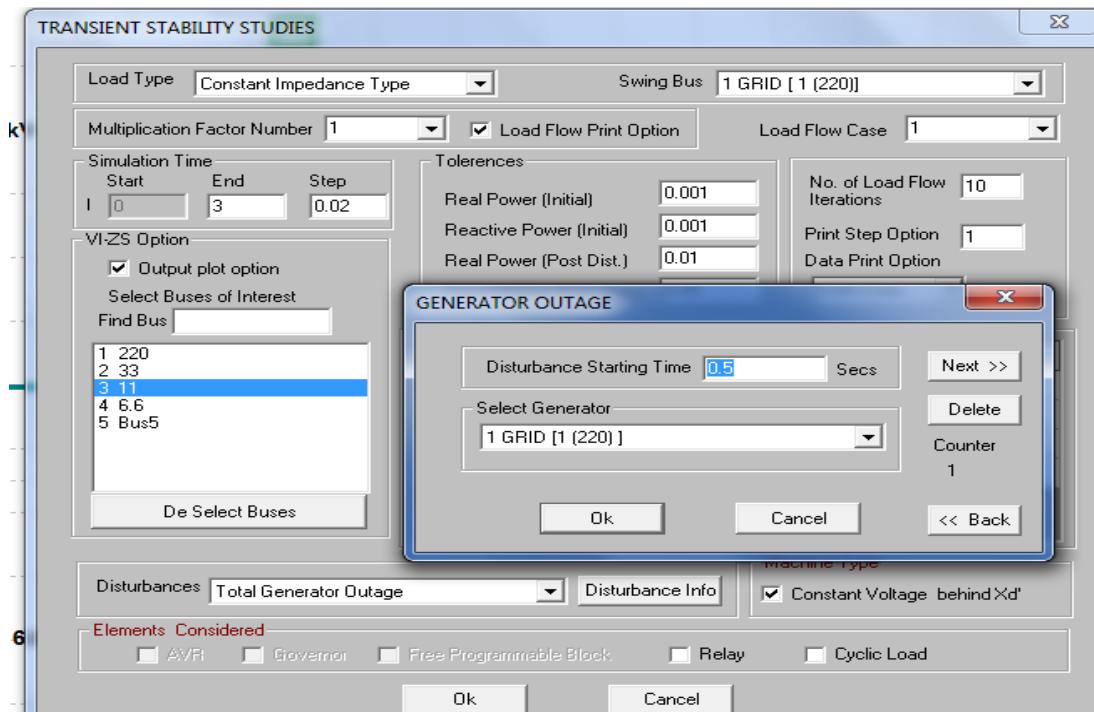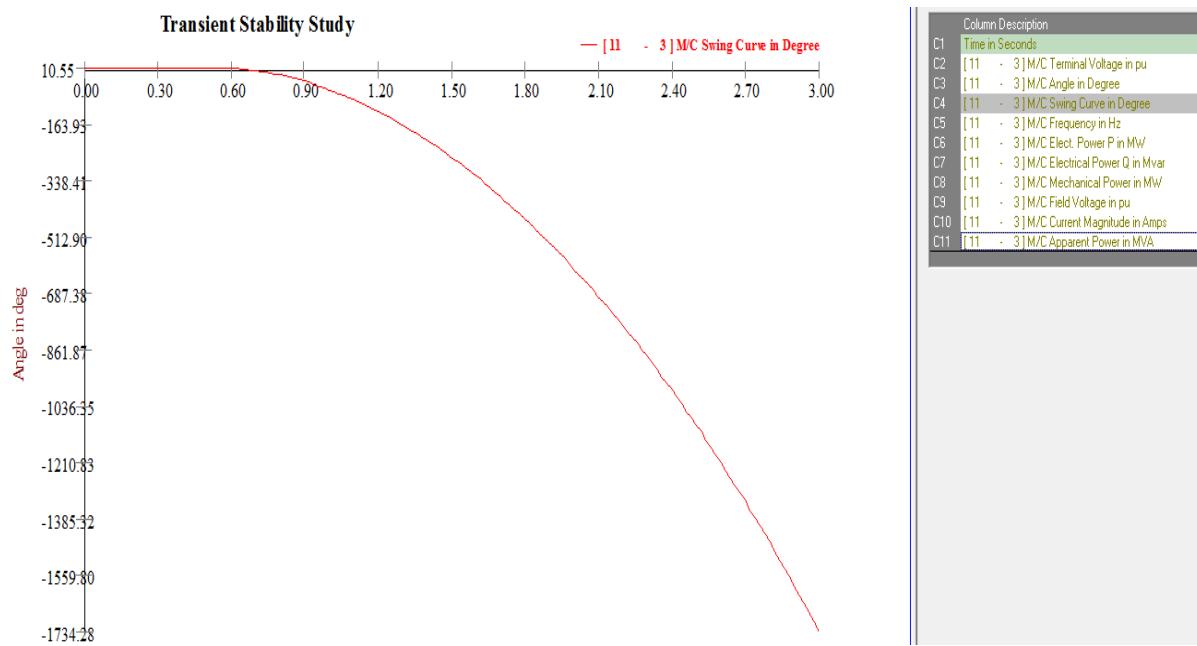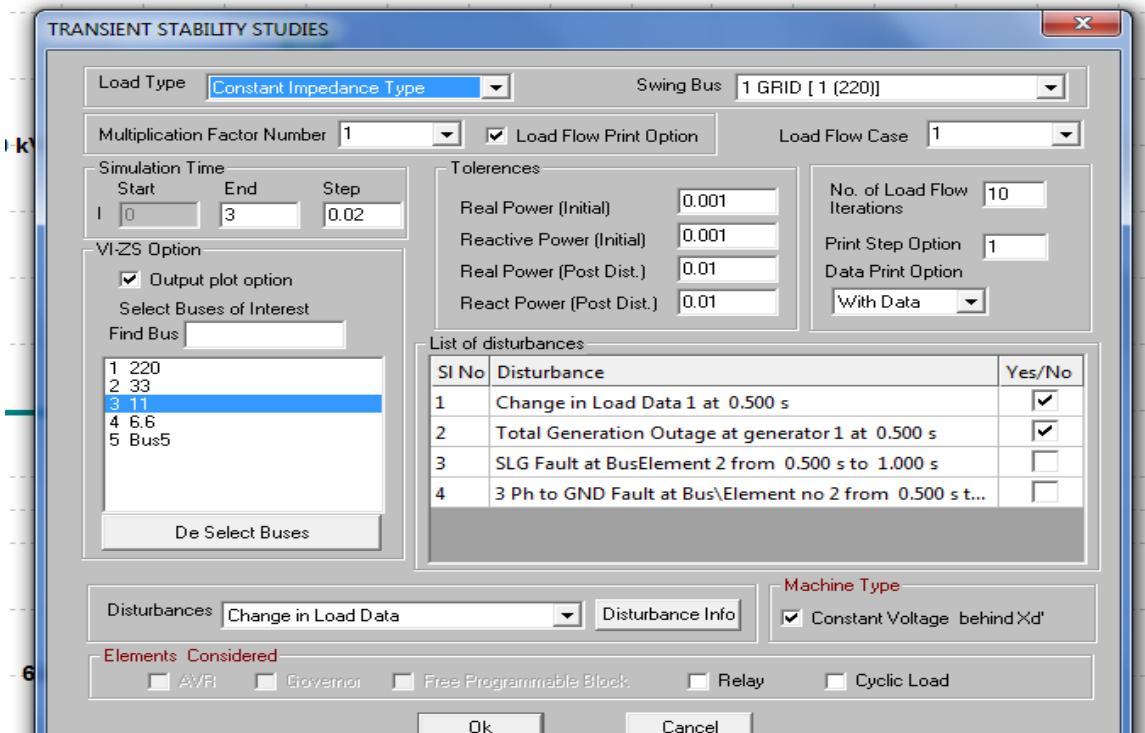
Unstable Condition:

Critical Clearing time of the generator: 0.84-0.5=0.34 sec

Case B: Making Grid 220 kV and 60 MW load off.

TRANSIENT STABILITY STUDIES

Load Type: Constant Impedance Type

Swing Bus: 1 GRID [1 (220)]

Multiplication Factor Number: 1   ☑ Load Flow Print Option   Load Flow Case: 1

Simulation Time

Start	End	Step
0	3	0.02

VI-ZS Option

☑ Output plot option

Select Buses of Interest

Find Bus

```
1  220
2  33
3  11
4  6.6
5  Bus5
```

De Select Buses

Tolerences

Real Power (Initial): 0.001
Reactive Power (Initial): 0.001
Real Power (Post Dist.): 0.01
React Power (Post Dist.): 0.01

No. of Load Flow Iterations: 10
Print Step Option: 1
Data Print Option: With Data

List of disturbances

Sl No	Disturbance	Yes/No
1	Change in Load Data 1 at 0.500 s	☑
2	Total Generation Outage at generator 1 at 0.500 s	☑
3	SLG Fault at BusElement 2 from 0.500 s to 1.000 s	☐
4	3 Ph to GND Fault at Bus\Element no 2 from 0.500 s t...	☐

Disturbances: Change in Load Data   Disturbance Info

Machine Type
☑ Constant Voltage behind Xd'

Elements Considered
☐ AVR   ☐ Governor   ☐ Free Programmable Block   ☐ Relay   ☐ Cyclic Load

Ok   Cancel

Transient Stability Study

— [11   - 3] M/C Swing Curve in Degree

Column Description	
C1	Time in Seconds
C2	[11 - 3] M/C Terminal Voltage in pu
C3	[11 - 3] M/C Angle in Degree
C4	[11 - 3] M/C Swing Curve in Degree
C5	[11 - 3] M/C Frequency in Hz
C6	[11 - 3] M/C Elect. Power P in MW
C7	[11 - 3] M/C Electrical Power Q in Mvar
C8	[11 - 3] M/C Mechanical Power in MW
C9	[11 - 3] M/C Field Voltage in pu
C10	[11 - 3] M/C Current Magnitude in Amps
C11	[11 - 3] M/C Apparent Power in MVA

After making the 60 MW load & grid off, the generator become unstable.