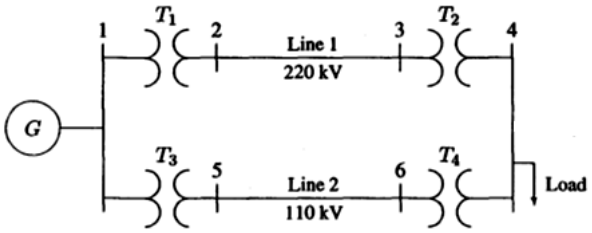
Experiment 2

Aim: To develop and study Simulink model of the power system networks for the given one-line diagram.

Circuit Diagram:



The reactance data of the elements are given below

Generator No. 1	90 MVA	22 kV	
Transformer T1	50 MVA	(3 phase) 22/220 kV	X=0.1 p.u.
Transformer T2	40 MVA	(3 phase) 220/11 kV	X = 0.06 p.u.
Transformer T3	40 MVA	(3 phase) 22/110 kV	X = 0.064 p.u.
Transformer T4	40 MVA	(3 phase) 110/11 kV	X = 0.08 p.u.

The three-phase load at bus 4 absorbs 57 MVA, 0.6 power factor lagging at 10.45 kV. Line 1 and line 2 have reactances of 48.4 and 65.43 Ω, respectively

Theory:

A one-line diagram of a power system shows the main connections and arrangements of components. Any particular component may or may not be shown depending on the information required in a system. A simplified diagram of an electric system is called a single-line or one-line diagram in which per phase equivalent of the three phase lines is shown omitting the neutral.

Procedure:

Develop a Simulink model of the given one-line diagram of the power network.

Simulink Model:

Observation:

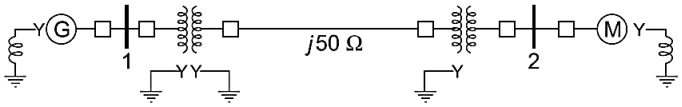
Output waveform of the Simulink model

Conclusion:

Question:

Q1. Draw the pu impedance diagram for the power system shown in Fig.. Neglect resistance, and use a base of 100 MVA, 220 kV in 50 W line. The ratings of the generator, motor and transformers are

Generator	40 MVA,	25 kV,	$X'' = 20\%$
Motor	50 MVA,	11 kV,	$X'' = 30\%$
Y–Y transformer,	40 MVA,	33 Y–220 Y kV,	$X = 15\%$
Y–Δ transformer,	30 MVA,	11 Δ–220 Y kV,	$X = 15\%$



Q2. Define infinite bus in the power system.

Q3. What is the purpose of VI measurement block in Simulink?