<u>**Experiment No. 09**</u>

9.1 Experiment Name

Load flow study using MATLAB Simulink platform

9.2 Objectives

- To become acquainted with the load flow study
- To understand the algorithm and generate a MATLAB code for load flow study
- To get familiar with the procedure of designing and analyzing a power system in MATLAB

9.3 Theory

Hundreds of buses and branches with impedances specified per unit on a common MVA base make up the power system network. Power flow studies, also known as load flow, are critical for power system analysis and design. Load flow assessments are required for planning, economic operation, scheduling, and power exchange between utilities.

Load Flow analysis in the Simulink platform is simple thanks to the basic functions of the SimPowerSystems^{TM} toolbox.

9.4 Required apparatus
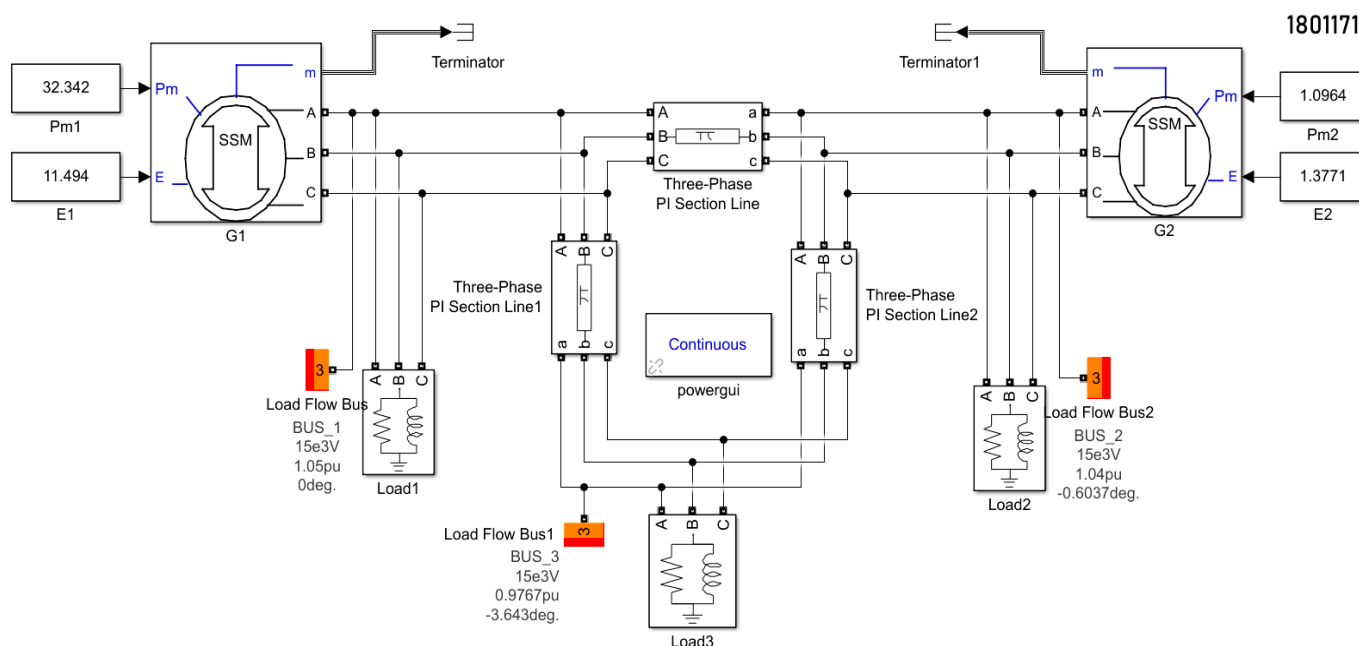
- MATLAB
- Simulink

9.5 Block diagram

Fig. 9.1: Circuit diagram for load flow study using MATLAB Simulink platform

9.6 Load flow analysis report

Summary for LoadFlowA : The load flow converged in 2 iterations !		
	P(MW)	Q(Mvar)
Total generation	541.900878	347.8396788
Total PQ load	529.9999899	304.9998704
Total Z shunt	-3.93381E-13	-0.000565169
Total ASM	0	0
Total losses	11.90088813	42.84037358
1 : BUS_1 V= 1.050 pu/15kV 0.00 deg ; Swing bus		
	P(MW)	Q(Mvar)
Generation	341.9008654	206.262553
PQ Load	80	30
Z shunt	-1.1191E-12	-0.000198569
BUS_2	37.23568962	18.99130098
BUS_3	224.6651758	157.2714506
2 : BUS_2 V= 1.040 pu/15kV -0.60 deg		
	P(MW)	Q(Mvar)
Generation	200.0000126	141.5771258
PQ Load	50	25
Z shunt	-1.55773E-12	-0.000194804
BUS_1	-37.07721481	-18.42177506
BUS_3	187.0772274	134.9990957
3 : BUS_3 V= 0.977 pu/15kV -3.64 deg		
	P(MW)	Q(Mvar)
Generation	0	0
PQ Load	399.9999899	249.9998704
Z shunt	2.28346E-12	-0.000171796
BUS_1	-217.8435069	-132.7143672
BUS_2	-182.156483	-117.2853314

9.7 Discussion & Conclusion

The exercise taught us how to create a three-bus system in the Simulink platform using the SimPowerSystems^{TM} toolbox. We tweaked the parameters of the generators, loads, and transmission lines after developing it.

In the load flow analysis phase, we used PowerShell to evaluate the system. We studied the system and replaced the system's values with new values. The system's objectives were met with success.