LOAD FLOW ANALYSIS

Objectives

- Carry out load flow studies of a given power system using power system simulators- Power World, MATLAB Simulink

Simulation Tool

- Power system simulators like PowerWorld, ETAP
- MATLAB for comparisons

Inputs

- Line data:

From Bus	To Bus	Z(pu)
1	3	j0.05
1	2	j0.025
2	3	j0.025

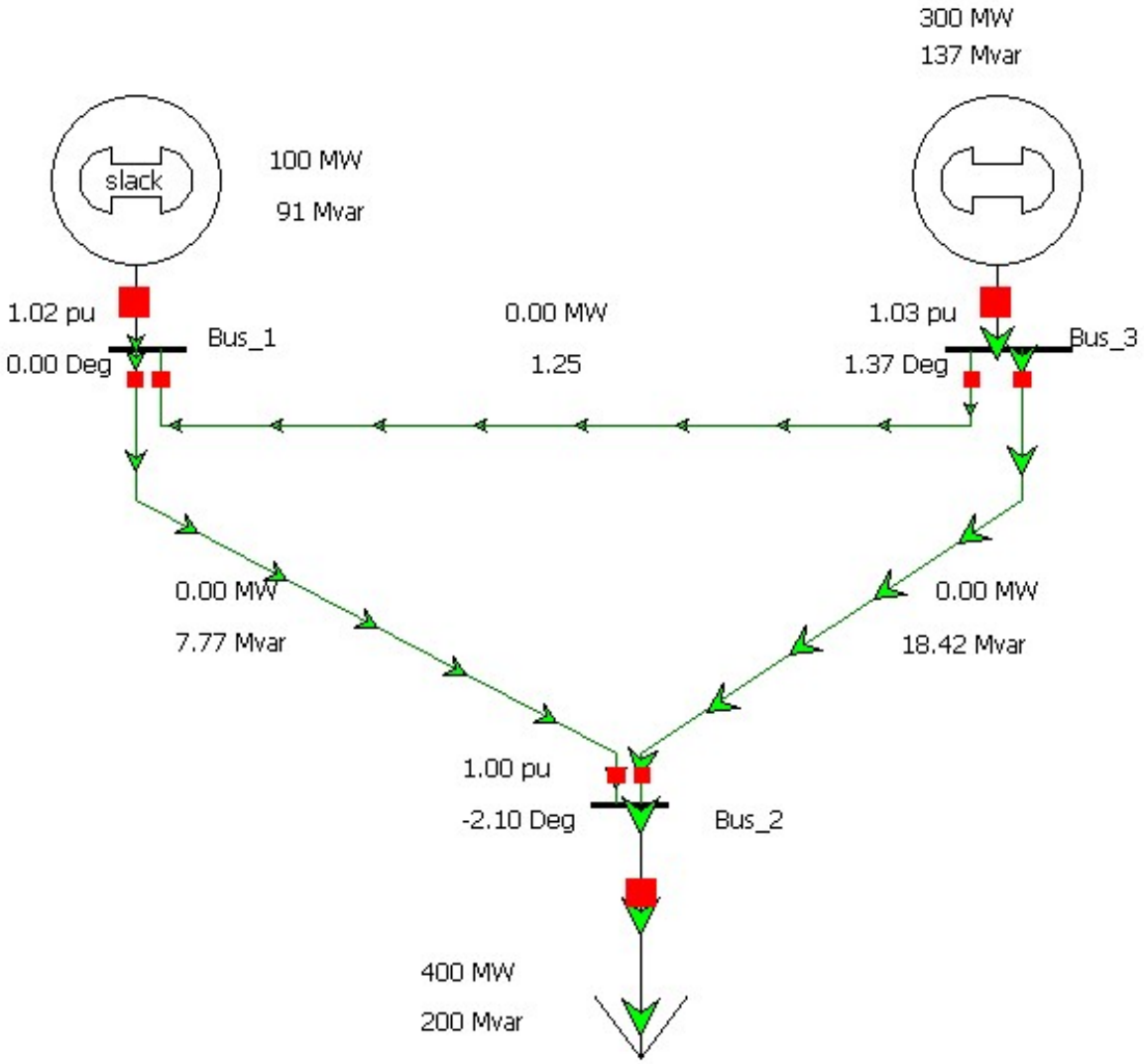
- Base values
  - 10kV, 100MVA base

Inputs

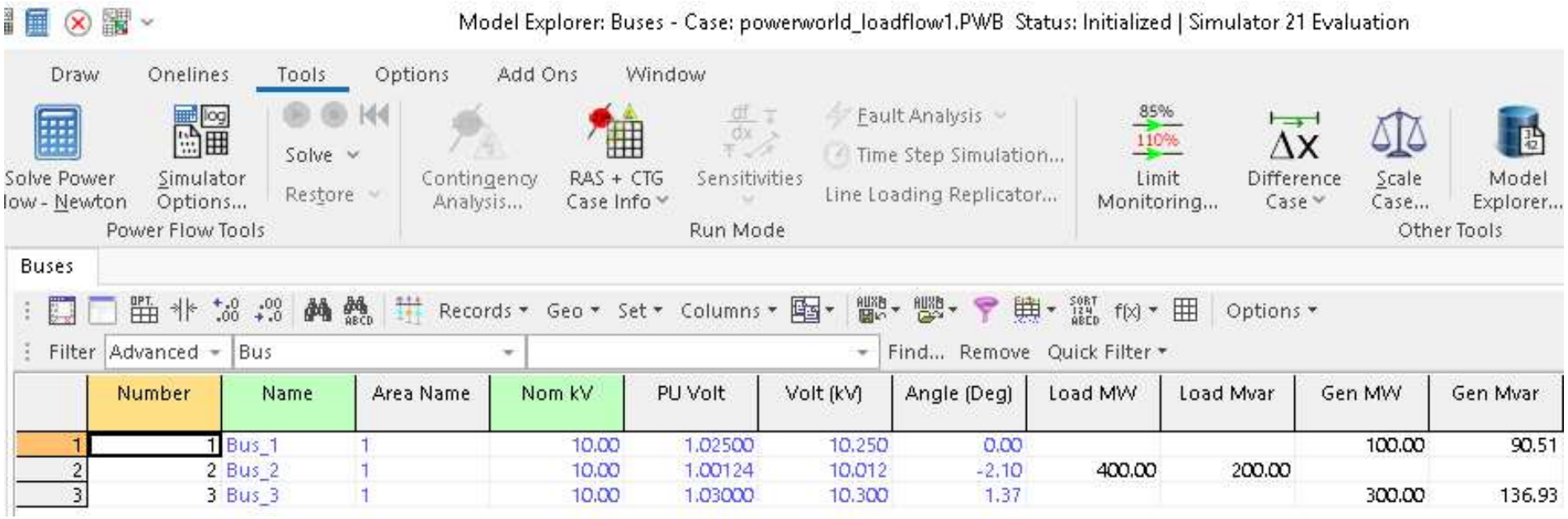
- Bus data:

Bus No.	Bus type	V (puV)	P_{gen} (puMW)	P_{load} (MW)	Q_{load} (MVAR)
1	Slack	1.025	-	-	-
2	PQ	-	0.0	400	200
3	PV	1.03	300	0.0	0.0

POWERWORLD

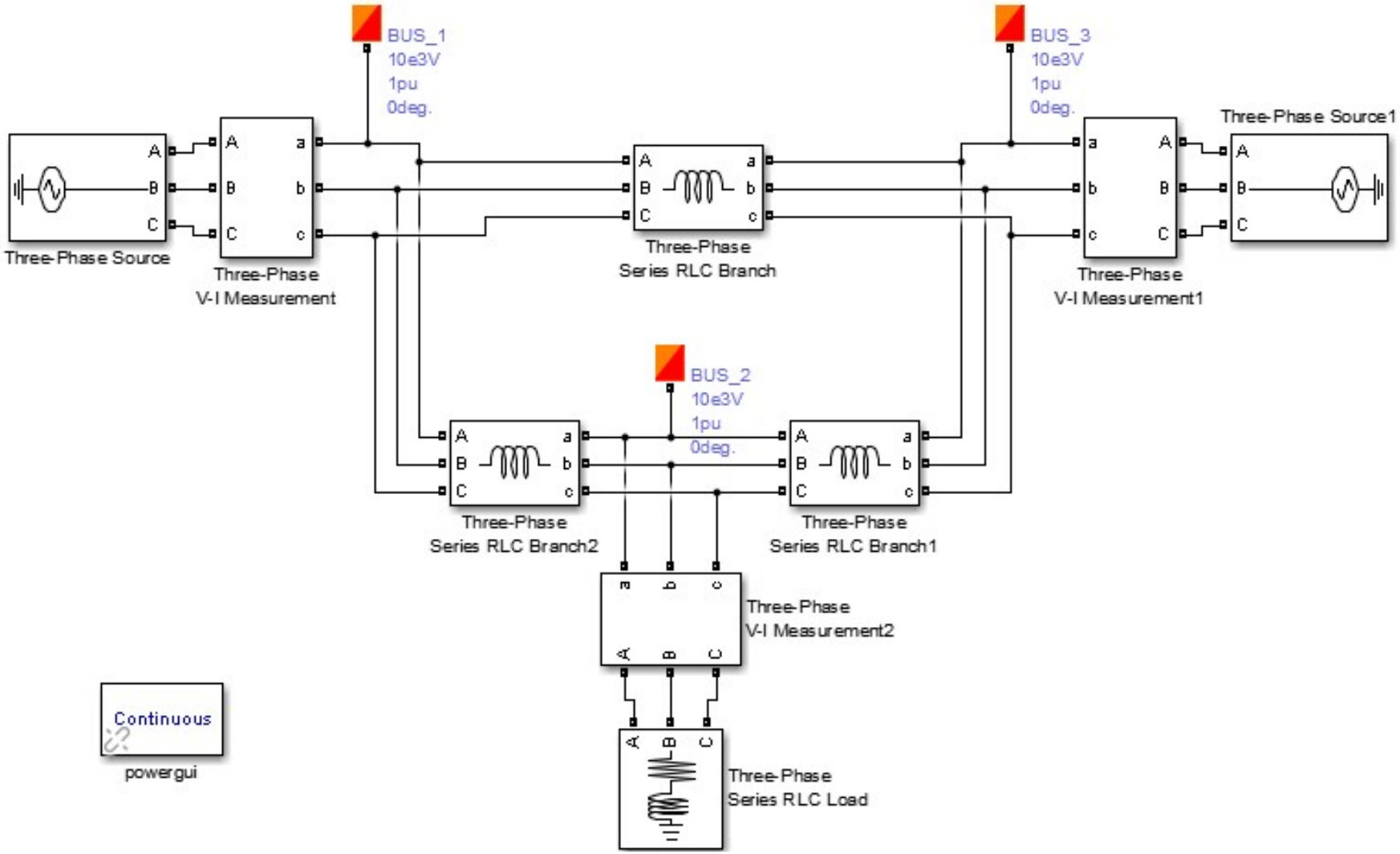

300 MW
137 Mvar
slack
100 MW
91 Mvar
1.02 pu
0.00 Deg
Bus_1
0.00 MW
1.25
1.03 pu
1.37 Deg
Bus_3
0.00 MW
7.77 Mvar
0.00 MW
18.42 Mvar
1.00 pu
-2.10 Deg
Bus_2
400 MW
200 Mvar

Results



	Number	Name	Area Name	Nom kV	PU Volt	Volt (kV)	Angle (Deg)	Load MW	Load Mvar	Gen MW	Gen Mvar
1	1	Bus_1	1	10.00	1.02500	10.250	0.00			100.00	90.51
2	2	Bus_2	1	10.00	1.00124	10.012	-2.10	400.00	200.00		
3	3	Bus_3	1	10.00	1.03000	10.300	1.37			300.00	136.93

MATLAB SIMULINK


BUS_1
10e3V
1pu
0deg.
BUS_3
10e3V
1pu
0deg.
Three-Phase Source1
Three-Phase Source
Three-Phase
V-I Measurement
Three-Phase
Series RLC Branch
Three-Phase
V-I Measurement1
BUS_2
10e3V
1pu
0deg.
Three-Phase
Series RLC Branch2
Three-Phase
Series RLC Branch1
Three-Phase
V-I Measurement2
Continuous
powergui
Three-Phase
Series RLC Load

Results

Powergui Load Flow Tool. model: matlab_loadflow1

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	Block type	Bus type	Bus ID	Vbase (kV)	Vref (pu)	Vangle (deg)	P (MW)	Q (Mv...	Qmin (Mvar)	Qmax (Mvar)	V_LF (pu)	Vangle_LF (deg)	P_LF (MW)	Q_LF (Mvar)
1	Vsrc	swing	BUS_1	10.00	1.0250	0.00	0.00	0.00	-Inf	Inf	1.0250	0.00	100.00	90.51
2	Vsrc	PV	BUS_3	10.00	1.0300	0.00	300.00	0.00	-Inf	Inf	1.0300	1.37	300.00	136.94
3	RLC load	PQ	BUS_2	10.00	1.0250	0.00	400.00	200.00	-Inf	Inf	1.0012	-2.10	400.00	200.00