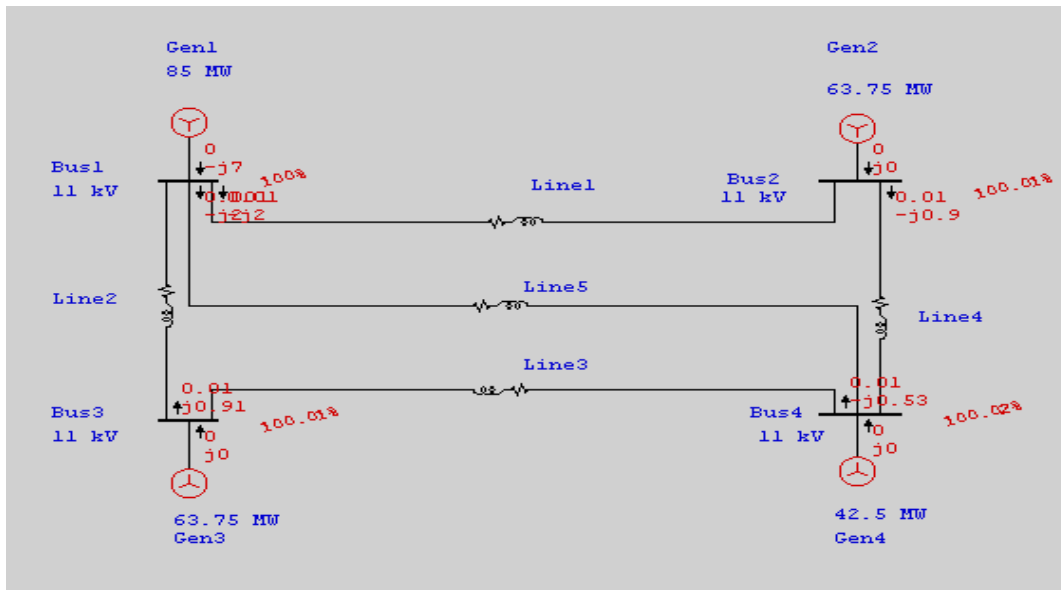


Aim: Single line diagram and load flow analysis using Gauss Seidal Method

Diagram:



ETAP

Project: Gauss Seidal
Location:
Contract:
Engineer
Filename: Engineer

5.0.3E
Study Case: LF

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Electrical Transient Analyzer Program

Load Flow Analysis

Loading Category (1): Design
Generation Category (1): Design
Load Diversity Factor: None

	<u>Swing</u>	<u>V control</u>	<u>load</u>	<u>Total</u>
Number of Buses	1	2	1	4

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>line cable</u>	<u>impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches	0	0	0	5	0	0	5

Method of Solution: Gauss Seidal Method
Maximum Number of iteration: 2000
Precision of Solution: 0.000001
Load Flow Acceleration Factor: 1.45
System Frequency: 60Hz
Unit System: English
Project Filename: Load Flow 1
Output filename: C:\ETAP 503\loadflow1\GS.1fr

Location:
Contract:
Engineer
Filename: Engineer

Study Case: LF

Date:
SN:
Revision: Base
Config.: Normal

Adjustments

Tolerance	Apply	Individual	Percent
	Adjustments	/ Global	
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Strength:	No		
Cable Length:	No		

Temperature Connection	Apply	Individual	Degree C
	Adjustments	/ Global	
Transmission Line Resistance:	Yes	Individual	
Cable Resistance:	Yes	Individual	

Project: Gauss Seidal
 Location:
 Contract:
 Engineer
 Filename: Engineer

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 Study Case: LF

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Bus Input Data

Bus			Initial Voltage		Load							
ID	kV	Sub-	% Mag.	Ang.	Constant kVA		Constant Z		Constant I		Generic	
					MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar
Bus1	11.000	1	100.0	0.0								
Bus2	11.000	1	100.0	0.0								
Bus3	11.000	1	100.0	0.0								
Bus4	11.000	1	100.0	0.0								
Total Number of Buses: 4												
					0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-	% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus3	11.000	Voltage	1	100.0	0.0	0.000			0.000	0.000
Bus4	11.000	Voltage	1	100.0	0.0	0.000			0.000	0.000
						0.000	0.000			

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Project: Gauss Seidal
Location:
Contract:
Engineer
Filename: Engineer

Study Case: LF

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Line/Cable Input Data

Line/Cable		Ohms or Siemens/1000 ft per Conductor (Cable) or per Phase (Line)							
ID	Library	Size	Length		#/Phase	T	R	X	Y
			Adj. (ft)	%					
Line1			5280.0	0.0	1	75	0.001894	2.083333	0.0000023
Line2			5280.0	0.0	1	75	0.037879	2.083333	0.0000023
Line3			5280.0	0.0	1	75	0.018939	2.272727	0.0000023
Line4			5280.0	0.0	1	75	0.018939	2.083333	0.0000021
Line5			5280.0	0.0	1	75	0.018939	2.272727	0.0000023

Line / Cable resistances are listed at the specified temperatures.

Project: Gauss Seidal
Location:
Contract:
Engineer
Filename: Engineer

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Study Case: LF

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Config: Normal

Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA			
ID	Type	From Bus	To Bus	R	X	Z	Y
Line1	Line	Bus1	Bus2	0.83	909.09	909.09	0.0014520
Line2	Line	Bus1	Bus3	16.53	909.09	909.24	0.0014520
Line3	Line	Bus4	Bus3	8.26	991.74	991.77	0.0014520
Line4	Line	Bus2	Bus4	8.26	909.09	909.13	0.0013310
Line5	Line	Bus1	Bus4	8.26	991.74	991.77	0.0014520

Project: Gauss Seidal
 Location:
 Contract:
 Engineer
 Filename: Engineer

5.30E
 Study Case: LF

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 Config.: Normal

LOAD FLOW REPORT

Bus		Voltage			Generation		Load		ID	Load Flow				XFM	
ID	kV	%	Ang.	MW	Mvar	MW	Mvar	MW		Mvar	Amp	%	% Tap		
*Bus1	11.000	100.000	0.0	0.000	-0.007	0	0	Bus2	0.000	-0.002	0.1	-0.3			
								Bus3	0.000	-0.002	0.1	0.3			
								Bus4	0.000	-0.002	0.1	0.0			
Bus2	11.000	100.015	0.0	0	0	0	0	Bus1	0.000	0.001	0.0	-0.7			
								Bus4	0.000	-0.001	0.0	-0.7			
Bus3	11.000	100.015	0.0	0	0	0	0	Bus1	0.000	0.001	0.0	0.8			
								Bus4	0.000	-0.001	0.0	0.8			
Bus4	11.000	100.017	0.0	0	0	0	0	Bus3	0.000	-0.001	0.0	-1.4			
								Bus2	0.000	0.000	0.0	1.5			
								Bus1	0.000	0.001	0.1	-0.1			

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

Indicates a bus with a load mismatch of more than 0.1 MVA

Project: Gauss Seidal
 Location:
 Contract:
 Engineer
 Filename: Engineer

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Study Case: LF

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 Config.: Normal

Bus Loading Summary Report

ID	Bus	kV	Rated	Directly Connected Load						Total Bus Load			Percent Loadin	
				Constant kVA		Constant Z		Constant I		Generic		MVA		%
				MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar			
Bus1		11.000		0	0	0	0	0	0	0	0	0.007	0.1	0.4
Bus2		11.000		0	0	0	0	0	0	0	0	0.001	0.7	0.0
Bus3		11.000		0	0	0	0	0	0	0	0	0.001	0.8	0.0
Bus4		11.000		0	0	0	0	0	0	0	0	0.001	0.8	0.1

* Indicates operating load of a bus exceeds the bus critical limit (% of the Continuous Ampere rating).

Indicates operating load of a bus exceeds the bus marginal limit (% of the Continuous Ampere rating).

Location:
Contract:
Engineer
Filename: Engineer

Study Case: LF

Date:
SN:
Revision: Base
Config.: Normal

Branch Loading Summary Report

CKT / Branch		Cable & Reactor			Transformer				
ID	Type	Ampacity (Amp)	Loading Amp	%	Capabilit y	<u>Loading (input)</u>		<u>Loading (output)</u>	
						MVA	%	MVA	%

* Indicates a branch with operating load exceeding the branch capability.

Contract:
 Engineer
 Filename: Engineer

Study Case: LF

SN:
 Revision: Base
 Config.: Normal

Alert Summary Report

CKT / Branch ID	From-To Bus		To-From Bus		Losses		% Bus Voltage		Vd % in
	Loading	Mvar	MW	Mvar	kW	kvar	From	To	
Line1	0.000	-0.002	0.000	0.001	0.500	-1.5	100.0	100.0	0.01
Line2	0.000	-0.002	0.000	0.001	0.500	-1.5	100.0	100.0	0.01
Line5	0.000	-0.002	0.000	0.001	0.500	-1.5	100.0	100.0	0.02
Line4	0.000	-0.001	0.000	0.000	0.500	-1.3	100.0	100.0	0.00
Line3	0.000	0.001	0.000	-0.001	0.500	-1.5	100.0	100.0	0.00
	Panel		100.0		95.0				
	Protective Device		100.0		0.0	-7.1			
	Generator		100.0		95.0				
<u>Bus Voltage</u>									
	OverVoltage		105.0		102.0				
	UnderVoltage		95.0		98.0				
<u>Generator Excitation</u>									
	OverExcited (Q)		100.0		95.0				
	UnderExcited (Q)		100.0						

Critical Report

ID	Device Type	Rating	Unit	Calculate	%Mag.
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ETAP
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Project: Gauss Seidal
Location:
Contract:
Engineer
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					<u>Condition</u>
Gen1	Generator	0.000	Mvar	-0.007	UnderExcited
Gen2	Generator	0.000	MW	0.000	UnderPower
Gen2	Generator	0.000	Mvar	0.000	UnderExcited
Gen3	Generator	0.000	MW	0.000	UnderPower
Gen3	Generator	0.000	Mvar	0.000	UnderExcited
Gen4	Generator	0.000	MW	0.000	UnderPower
Gen4	Generator	0.000	Mvar	0.000	UnderExcited

Project: Gauss Seidal
Location:
Contract:
Engineer
Filename: Engineer

ETAP
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Study Case: LF

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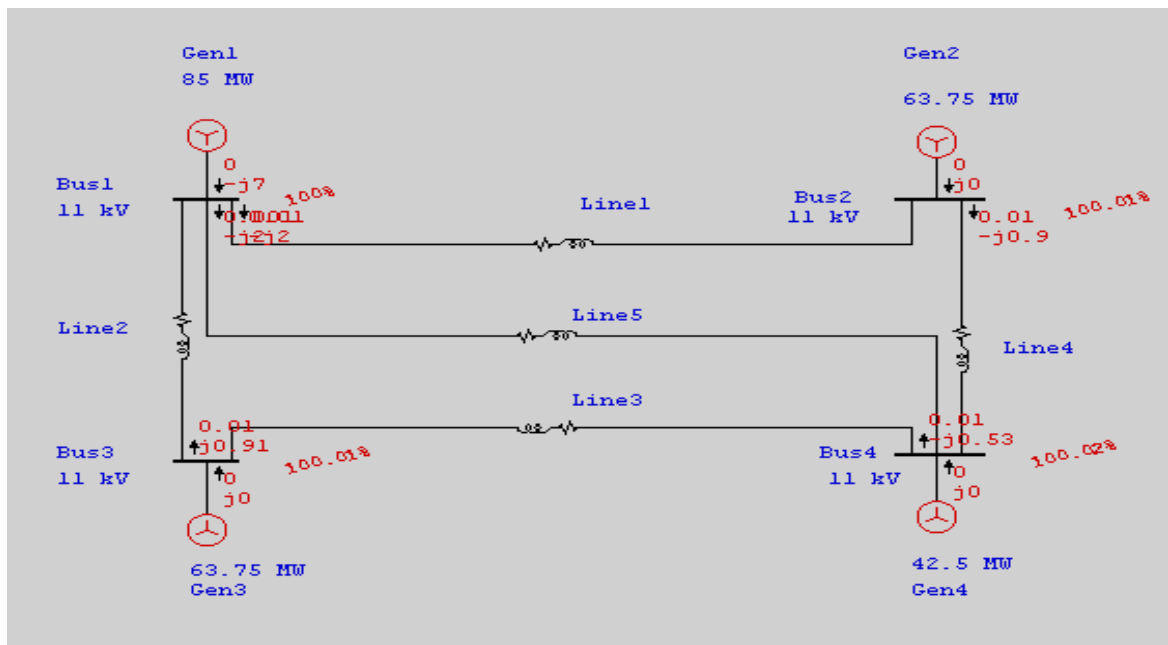
SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>
Source (Swing Buses):	0.000	-0.007	0.007	0.00 Leading
Source (Non-Swing Buses):	0.000	0.000	0.000	100.00 Lagging
Total Demand:	0.000	-0.007	0.007	0.00 Leading
Total Motor Load:	0.000	0.000	0.000	0.83 Lagging
Total Static Load:	0.000	0.000		
Apparent Losses:	0.000	-0.007		
System Mismatch:	0.000	0.000		

Number of Iterations: 22

Aim: Single line diagram and load flow analysis using Newton Raphson Method

Diagram:



ETAP

5.30E

Project: Gauss Seidal
Location:
Contract:
Engineer
Filename: Engineer

Study Case: LF

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Revision: Base
Config.: Normal

Electrical Transient Analyzer Program

Load Flow Analysis

Loading Category (1): Design
Generation Category (1): Design
Load Diversity Factor: None

	<u>Swing</u>	<u>V control</u>	<u>load</u>	<u>Total</u>
Number of Buses	1	2	1	4

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>line cable</u>	<u>impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches	0	0	0	5	0	0	5

Method of Solution: Gauss Seidal Method
Maximum Number of iteration: 2000
Precision of Solution: 0.000001
Load Flow Acceleration Factor: 1.45
System Frequency: 60Hz
Unit System: English
Project Filename: Load Flow 1
Output filename: C:\ETAP 503\loadflow1\GS.1fr

Project: Gauss Seidal
Location:
Contract:
Engineer
Filename: Engineer

ETAP
5.30E

Study Case: LF

Page: 2
Date:
SN:
Revision: Base
Config.: Normal

Adjustments

Tolerance	Apply Adjustments	Individual / Global	Percent
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Strength:	No		
Cable Length:	No		

Temperature Connection	Apply Adjustments	Individual / Global	Degree C
Transmission Line Resistance:	Yes	Individual	
Cable Resistance:	Yes	Individual	

Project: Gauss Seidal
 Location:
 Contract:

ETAP
 5.30E

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 Date:
 SN:

Engineer

Bus Input Data

Bus			Initial Voltage		Load								
ID	kV	Sub-	% Mag.	Ang.	Constant kVA		Constant Z		Constant I		Generic		
					MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar	
Bus1	11.000	1	100.0	0.0									
Bus2	11.000	1	100.0	0.0									
Bus3	11.000	1	100.0	0.0									
Bus4	11.000	1	100.0	0.0									
Total Number of Buses: 4							0.000	0.000	0.000	0.000	0.000	0.000	0.000

Generation Bus				Voltage		Generation			Mvar Limits	
ID	kV	Type	Sub-	% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus1	11.000	Swing	1	100.0	0.0					
Bus3	11.000	Voltage	1	100.0	0.0	0.000			0.000	0.000
Bus4	11.000	Voltage	1	100.0	0.0	0.000			0.000	0.000
						0.000	0.000			

Study Case: LF
 Filename: Engineer

Revision: Base

Config.: Normal

ETAP

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Project: Gauss Seidal
Location:
Contract:
Engineer
Filename: Engineer

Study Case: LF

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Date:
SN:
Revision: Base
Config.: Normal

Line/Cable Input Data

<u>Line/Cable</u>		<u>Ohms or Siemens/1000 ft per Conductor (Cable) or per Phase (Line)</u>							
<u>ID</u>	<u>Library</u>	<u>Size</u>	<u>Length</u>		<u>#/Phase</u>	<u>T</u>	<u>R</u>	<u>X</u>	<u>Y</u>
			<u>Adj. (ft)</u>	<u>%</u>					
Line1			5280.0	0.0	1	75	0.001894	2.083333	0.0000023
Line2			5280.0	0.0	1	75	0.037879	2.083333	0.0000023
Line3			5280.0	0.0	1	75	0.018939	2.272727	0.0000023
Line4			5280.0	0.0	1	75	0.018939	2.083333	0.0000021
Line5			5280.0	0.0	1	75	0.018939	2.272727	0.0000023

Line / Cable resistances are listed at the specified temperatures.

ETAP
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Project: Gauss Seidal
Location:
Contract:
Engineer
Filename: Engineer

Study Case: LF

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Config.: Normal

Branch Connections

<u>CKT/Branch</u>		<u>Connected Bus ID</u>		<u>% Impedance, Pos. Seq., 100 MVA</u>			
<u>ID</u>	<u>Type</u>	<u>From Bus</u>	<u>To Bus</u>	<u>R</u>	<u>X</u>	<u>Z</u>	<u>Y</u>
Line1	Line	Bus1	Bus2	0.83	909.09	909.09	0.0014520
Line2	Line	Bus1	Bus3	16.53	909.09	909.24	0.0014520
Line3	Line	Bus4	Bus3	8.26	991.74	991.77	0.0014520
Line4	Line	Bus2	Bus4	8.26	909.09	909.13	0.0013310
Line5		Bus1	Bus4	8.26	991.74	991.77	0.0014520

ETAP
5.30E

Project: Gauss Seidal
 Location:
 Contract:
 Engineer
 Filename: Engineer

Study Case: LF

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 SN:
 Revision: Base
 Config.: Normal

LOAD FLOW REPORT

Bus ID	Voltage			Generation		Load		ID	Load Flow				XFM	
	kV	%	Ang.	MW	Mvar	MW	Mvar		MW	Mvar	Amp	%	% Tap	
*Bus1	11.000	100.000	0.0	0.000	-0.007	0	0	Bus2	0.000	-0.002	0.1	-0.3		
								Bus3	0.000	-0.002	0.1	0.3		
								Bus4	0.000	-0.002	0.1	0.0		
Bus2	11.000	100.015	0.0	0	0	0	0	Bus1	0.000	0.001	0.0	-0.7		
								Bus4	0.000	-0.001	0.0	-0.7		
Bus3	11.000	100.015	0.0	0	0	0	0	Bus1	0.000	0.001	0.0	0.8		
								Bus4	0.000	-0.001	0.0	0.8		
Bus4	11.000	100.017	0.0	0	0	0	0	Bus3	0.000	-0.001	0.0	-1.4		
								Bus2	0.000	0.000	0.0	1.5		
								Bus1	0.000	0.001	0.1	-0.1		

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)

Indicates a bus with a load mismatch of more than 0.1 MVA

ETAP
5.30E

Project: Gauss Seidal
Location:
Contract:
Engineer
Filename: Engineer

Study Case: LF

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Config.: Normal

Bus Loading Summary Report

ID	Bus	kV	Rated	Directly Connected Load						Total Bus Load			Percent Loadin	
				Constant kVA		Constant Z		Constant I		Generic		MVA		%
				MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar			
Bus1		11.000		0	0	0	0	0	0	0	0	0.007	0.1	0.4
Bus2		11.000		0	0	0	0	0	0	0	0	0.001	0.7	0.0
Bus3		11.000		0	0	0	0	0	0	0	0	0.001	0.8	0.0
Bus4		11.000		0	0	0	0	0	0	0	0	0.001	0.8	0.1

* Indicates operating load of a bus exceeds the bus critical limit (% of the Continuous Ampere rating).

Indicates operating load of a bus exceeds the bus marginal limit (% of the Continuous Ampere rating).

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Project: Gauss Seidal

Location:

Contract:

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Branch Loading Summary Report

Study Case: LF

Engineer

Filename: Engineer

Revision: Base

CKT / Branch

Cable & Reactor

Transformer

ID	Type	Ampacity (Amp)	Loading Amp	%	Capabilit y	<u>Loading (input)</u>		<u>Loading (output)</u>	
						MVA	%	MVA	%

Config.: Normal

* Indicates a branch with operating load exceeding the branch capability.

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Project: Gauss Seidal
Location:

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Date:

Branch Losses Summary Report

Contract:

SN:

CKT / Branch ID	From-To Bus		To-From Bus		Losses		% Bus Voltage		Vd % in
	MW	Mvar	MW	Mvar	kW	kvar	From	To	
Line1	0.000	-0.002	0.000	0.001	0.0	-1.5	100.0	100.0	0.01
Line2	0.000	-0.002	0.000	0.001	0.0	-1.5	100.0	100.0	0.01
Line5	0.000	-0.002	0.000	0.001	0.0	-1.5	100.0	100.0	0.02
Line4	0.000	-0.001	0.000	0.000	0.0	-1.3	100.0	100.0	0.00
Line3	0.000	-0.001	0.000	-0.001	0.0	-1.5	100.0	100.0	0.00
					0.0	-7.1			

Engineer
Filename: Engineer

Study Case: LF

Revision: Base
Config.: Normal

ETAP
5.30E

Project: Gauss Seidal
Location:
Contract:

Page: 10
Date:

Alert Summary Report

Engineer

% Alert Settings

SN:
Study Case: LF
Revision: Base

Filename: Engineer

Loading

	<u>Critical</u>	<u>Marginal</u>
Bus	100.0	95.0
Cable	100.0	95.0
Reactor	100.0	95.0
Line	100.0	95.0
Transformer	100.0	95.0
Panel	100.0	95.0
Protective Device	100.0	95.0
Generator	100.0	95.0

Config.: Normal

Bus Voltage

OverVoltage	105.0	102.0
UnderVoltage	95.0	98.0

Generator Excitation

OverExcited (Q)	100.0	95.0
UnderExcited (Q)	100.0	

Critical Report

<u>ID</u>	<u>Device Type</u>	<u>Rating</u>	<u>Unit</u>	<u>Calculate</u>	<u>%Mag.</u>	<u>Condition</u>
Gen1	Generator	0.000	Mvar	-0.007		UnderExcited
Gen2	Generator	0.000	MW	0.000		UnderPower
Gen2	Generator	0.000	Mvar	0.000		UnderExcited
Gen3	Generator	0.000	MW	0.000		UnderPower
Gen3	Generator	0.000	Mvar	0.000		UnderExcited
Gen4	Generator	0.000	MW	0.000		UnderPower
Gen4	Generator	0.000	Mvar	0.000		UnderExcited

Project: Gauss Seidal
Location:
Contract:

ETAP
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SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

Engineer
Filename: Engineer

Study Case: LF

Revision: Base

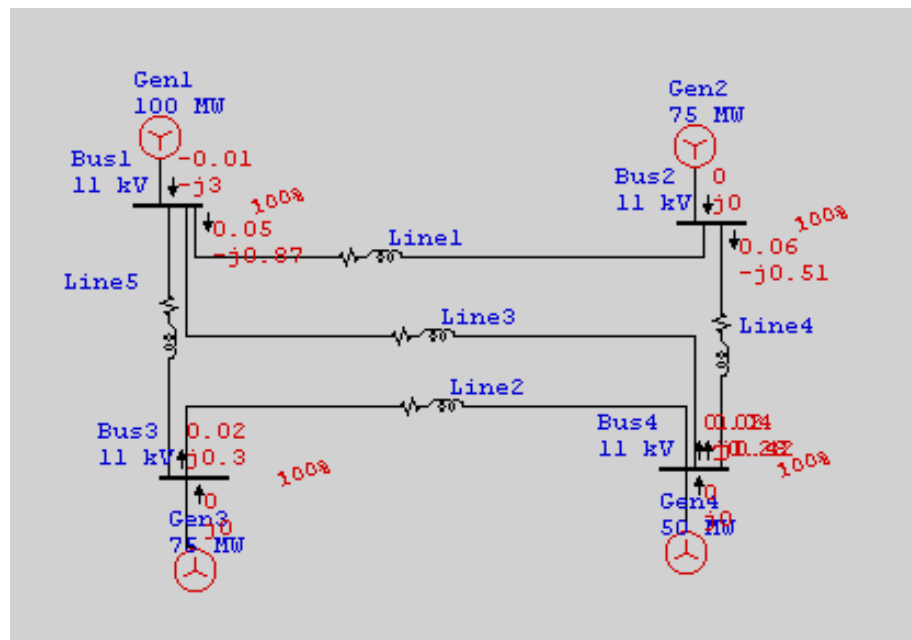
	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>
Source (Swing Buses):	0.000	-0.007	0.007	0.00 Leading
Source (Non-Swing Buses):	0.000	0.000	0.000	100.00 Lagging
Total Demand:	0.000	-0.007	0.007	0.00 Leading
Total Motor Load:	0.000	0.000	0.000	0.83 Lagging
Total Static Load:	0.000	0.000		
Apparent Losses:	0.000	-0.007		
System Mismatch:	0.000	0.000		

Config.: Normal

Number of Iterations: 22

Aim: Single line diagram and load flow analysis using Fast Decoupled Method

Diagram:



Project: Fast Decoupled
Location:
Contract:
Engineer
Filename: Engineer

ETAP
5.0.3E

Study Case: LF

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SN:
Revision: Base
Config.: Normal

Electrical Transient Analyzer Program

Load Flow Analysis

Loading Category (1): Design
Generation Category (1): Design
Load Diversity Factor: None

	<u>Swing</u>	<u>V control</u>	<u>load</u>	<u>Total</u>
Number of Buses	1	3	0	3

	<u>XFMR2</u>	<u>XFMR3</u>	<u>Reactor</u>	<u>line cable</u>	<u>impedance</u>	<u>Tie PD</u>	<u>Total</u>
Number of Branches	0	0	0	5	0	0	5

Method of Solution: Fast Decoupled
Maximum Number of iteration: 99
Precision of Solution: 0.000100

Load Flow Acceleration Factor: 1.45
 System Frequency: 60Hz
 Unit System: English
 Project Filename: Load Flow 1
 Output filename: C:\ETAP 503\loadflow1\FAST DECOPULE.1fr

ETAP

Project: Fast Decoupled
 Location:
 Contract:
 Engineer
 Filename: Engineer

5.30E

Study Case: LF

Page: 2
 Date:
 SN:
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 Config.: Normal

Adjustments

Tolerance	Apply	Individual	Percent
	Adjustments	/ Global	
Transformer Impedance:	Yes	Individual	
Reactor Impedance:	Yes	Individual	
Overload Heater Resistance:	No		
Transmission Line Strength:	No		
Cable Length:	No		
Temperature Connection	Apply	Individual	Degree C
	Adjustments	/ Global	
Transmission Line Resistance:	Yes	Individual	
Cable Resistance:	Yes	Individual	

ETAP

Bus Input Data

Project: Fast Decoupled

<u>Bus</u>			<u>Initial Voltage</u>		<u>Load</u>							
ID	kV	Sub-	% Mag.	Ang.	<u>Constant kVA</u>		<u>Constant Z</u>		<u>Constant I</u>		<u>Generic</u>	
					MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar
Bus1	11.000	1	100.0	0.0								
Bus2	11.000	1	100.0	0.0								
Bus3	11.000	1	100.0	0.0								
Bus4	11.000	1	100.0	0.0								
Total Number of Buses: 4					0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

<u>Generation Bus</u>				<u>Voltage</u>		<u>Generation</u>			<u>Mvar Limits</u>	
ID	kV	Type	Sub-	% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus1	11.000	Swing	1	100.0	0.0					
Bus3	11.000	Voltage	1	100.0	0.0	0.000			0.000	0.000
Bus4	11.000	Voltage	1	100.0	0.0	0.000			0.000	0.000
						0.000	0.000			

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Line/Cable Data

Line/Cable		Ohms or Siemens/1000 ft per Conductor (Cable) or per Phase (Line)													
ID	ID	kV	Sub	Initial Voltage		Constant kVA		Constant Z		Constant I			Generic		
				Library	% Mag.	Ang. Size	MW Adj. (ft)	Mvar %	#/Phase	MW _T	Mvar _R	MW _X	Mvar _Y	MW	Mvar
Bus1	Line1	11.000	1		100.0	0.0	5280.0	0.0	1	75	0.757576	0.378788	0.0000006		
Bus2	Line2	11.000	1		100.0	0.0	5280.0	0.0	1	75	0.568182	0.946970	0.0000011		
Bus3	Line3	11.000	1		100.0	0.0	5280.0	0.0	1	75	1.515152	0.946970	0.0000011		
Bus4	Line4	11.000	1		100.0	0.0	5280.0	0.0	1	75	0.946970	1.515152	0.0000006		
Total Number of Buses: 4							5280.0	0.000	1	0.00075	0.0004545	0.0003636	0.0000009000		

Line / Cable resistances are listed at the specified temperatures.

ID	kV	Type	Sub-	Voltage		Generation			Mvar Limits	
				% Mag.	Angle	MW	Mvar	% PF	Max	Min
Bus1	11.000	Swing	1	100.0	0.0					
Bus3	11.000	Voltage	1	100.0	0.0	0.000			0.000	0.000
Bus4	11.000	Voltage	1	100.0	0.0	0.000			0.000	0.000
						0.000			0.000	0.000

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Branch Connections

CKT/Branch		Connected Bus ID		% Impedance, Pos. Seq., 100 MVA			
ID	Type	From Bus	To Bus	R	X	Z	Y
Line1	Line	Bus1	Bus2	0.83	165.29	369.60	0.0003630
Line2	Line	Bus1	Bus3	247.93	413.22	481.90	0.0007260
Line3	Line	Bus4	Bus3	661.16	413.22	779.67	0.0007260
Line4	Line	Bus2	Bus4	413.22	661.16	779.67	0.0003630
Line5		Bus1	Bus4	743.80	495.87	893.94	0.0006050

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LOAD FLOW REPORT

Bus		Voltage			Generation		Load		ID	Load Flow				XFM	
ID	kV	%	Ang.	MW	Mvar	MW	Mvar	MW		Mvar	Amp	%	% Tap		
*Bus1	11.000	100.000	0.0	0.000	-0.003	0	0	Bus2	0.000	-0.001	0.0	-5.8			
								Bus3	0.000	-0.001	0.1	3.9			
								Bus4	0.000	-0.001	0.0	2.7			
Bus2	11.000	100.001	0.0	0	0	0	0	Bus1	0.000	0.001	0.0	-9.9			
								Bus4	0.000	-0.001	0.0	-10.9			
Bus3	11.000	100.003	0.0	0	0	0	0	Bus1	0.000	0.000	0.0	5.08			
								Bus4	0.000	0.000	0.0	8.4			
Bus4	11.000	100.003	0.0	0	0	0	0	Bus3	0.000	0.000	0.0	-3.6			
								Bus2	0.000	0.000	0.0	13.9			
								Bus1	0.000	0.000	0.0	-35.2			

* Indicates a voltage regulated bus (voltage controlled or swing type machine connected to it)
 # Indicates a bus with a load mismatch of more than 0.1 MVA

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Bus Loading Summary Report

ID	Bus	kV	Rated	Directly Connected Load						Total Bus Load			Percent Loadin	
				Constant kVA		Constant Z		Constant I		Generic		MVA		%
				MW	Mvar	MW	Mvar	MW	Mvar	MW	Mvar			
Bus1		11.000		0	0	0	0	0	0	0	0	0.003	2.3	0.1
Bus2		11.000		0	0	0	0	0	0	0	0	0.001	10.9	0.0
Bus3		11.000		0	0	0	0	0	0	0	0	0	8.2	0.0
Bus4		11.000		0	0	0	0	0	0	0	0	0	12.9	0.0

* Indicates operating load of a bus exceeds the bus critical limit (% of the Continuous Ampere rating).

Indicates operating load of a bus exceeds the bus marginal limit (% of the Continuous Ampere rating).

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Branch Loading Summary Report

CKT / Branch		Cable & Reactor			Transformer				
ID	Type	Ampacity (Amp)	Loading Amp	%	Capabilit y	<u>Loading (input)</u>		<u>Loading (output)</u>	
						MVA	%	MVA	%

* Indicates a branch with operating load exceeding the branch capability.

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Branch Losses Summary Report

<u>CKT / Branch</u> ID	<u>From-To Bus</u>		<u>To-From Bus</u>		<u>Losses</u>		<u>% Bus Voltage</u>		Vd % in
	MW	Mvar	MW	Mvar	kW	kvar	From	To	
Line1	0.000	-0.001	0.000	0.001	0.0	-0.4	100.0	100.0	0.00
Line2	0.000	-0.001	0.000	0.000	0.0	-0.7	100.0	100.0	0.00
Line5	0.000	-0.001	0.000	0.000	0.0	-0.6	100.0	100.0	0.00
Line4	0.000	-0.001	0.000	0.000	0.0	-0.4	100.0	100.0	0.00
Line3	0.000	0.000	0.000	0.000	0.0	-0.7	100.0	100.0	0.00
					0.0	-2.8			

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Alert Summary Report

% Alert Settings

<u>Loading</u>	<u>Critical</u>	<u>Marginal</u>
Bus	100.0	95.0
Cable	100.0	95.0
Reactor	100.0	95.0
Line	100.0	95.0
Transformer	100.0	95.0
Panel	100.0	95.0
Protective Device	100.0	95.0
Generator	100.0	95.0

Bus Voltage

OverVoltage	105.0	102.0
UnderVoltage	95.0	98.0

Generator Excitation

OverExcited (Q)	100.0	95.0
UnderExcited (Q)	100.0	95.0

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Critical Report

<u>ID</u>	<u>Device Type</u>	<u>Rating</u>	<u>Unit</u>	<u>Calculate</u>	<u>%Mag.</u>	<u>Condition</u>
Gen1	Generator	0.000	MW	0.000		UnderPower
Gen1	Generator	0.000	MVar	- 0.003		UnderExcited
Gen2	Generator	0.000	MW	0.000		UnderPower
Gen2	Generator	0.000	MVar	0.000		UnderExcited
Gen3	Generator	0.000	MW	0.000		UnderPower
Gen3	Generator	0.000	MVar	0.000		UnderExcited
Gen3	Generator	0.000	MW			UnderExcited

SUMMARY OF TOTAL GENERATION, LOADING & DEMAND

	<u>MW</u>	<u>Mvar</u>	<u>MVA</u>	<u>% PF</u>
Source (Swing Buses):	0.000	-0.003	0.003	0.50 Lagging
Source (Non-Swing Buses):	0.000	0.000	0.000	100.00 Lagging
Total Demand:	0.000	-0.003	0.003	0.50 Lagging
Total Motor Load:	0.000	0.000	0.000	99.74 Leading
Total Static Load:	0.000	0.000		
Apparent Losses:	0.000	-0.003		
System Mismatch:	0.000	0.000		

Number of Iterations: 1

Write.....Gen 4

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Generator 0.000 MW 0.000 UnderE

