



Automatic Scaling

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Purpose

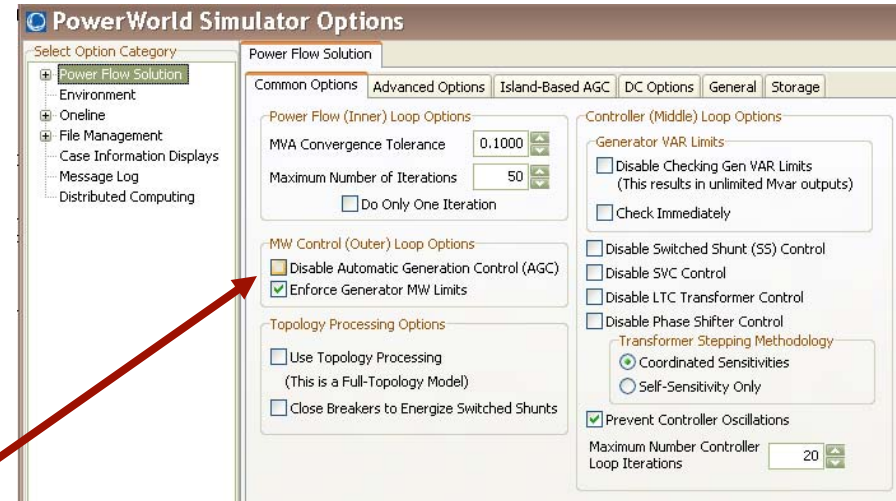
- Scale injection groups using PW's scripting commands
- Adjust a case to different stressed conditions by scaling a source and sink

Overview

- Scale *defined* injection group
 - Initialize scaling
 - Scale *defined* injection group in increment
- Scale *slack* injection group
 - Initialize scaling
 - Scale *slack* injection group in increment
- SOLVE
- Repeat for additional scaling increments

Assumptions

- Using the latest version of PowerWorld 17
- Simulator Options:
 - Enabled AGC for all generation
 - Northwest = *part. AGC*



Area	AreaNum (1)	AreaName (A)	BGAGC	BGGenMW	BGLoadMW	BGShuntMW	BG
1	10	NEW MEXICO	Area Slack	2035.89	1804.03	0.00	
2	11	EL PASO	Area Slack	463.80	1155.95	0.00	
3	14	ARIZONA	Area Slack	17684.99	11330.36	0.00	
4	18	NEVADA	Area Slack	2764.30	3190.48	0.00	
5	20	MEXICO-CFE	Area Slack	884.23	1056.71	0.00	
6	21	IMPERIALCA	Area Slack	883.81	349.20	0.00	
7	22	SANDIEGO	Area Slack	1388.07	2832.55	0.00	
8	24	SOCALIF	Area Slack	11433.77	13821.39	0.00	
9	26	LADWP	Area Slack	1969.80	3129.15	0.00	
10	30	PG AND E	Off AGC	10840.61	12565.94	0.00	
11	40	NORTHWEST	Part. AGC	17725.64	17403.25	0.00	
12	50	B.C.HYDRO	Area Slack	6659.72	7042.05	0.00	
13	52	FORTISBC	Area Slack	341.24	652.97	0.00	
14	54	ALBERTA	Area Slack	7871.79	7661.00	0.00	
15	60	IDAHO	Area Slack	3495.86	1937.70	0.00	
16	62	MONTANA	Area Slack	3356.34	1328.67	0.01	
17	63	WAPA U.M.	Area Slack	58.25	-75.20	0.00	
18	64	SIERRA	Area Slack	1362.96	1461.49	0.00	
19	65	PACE	Area Slack	5918.63	5540.50	-0.01	
20	70	PSCOLORADO	Area Slack	3716.12	4344.69	0.00	
21	73	WAPA R.M.	Area Slack	4580.16	3426.19	0.00	

Script {Part 1}

- Script
- {
- // Create injection group field to specify whether or not to scale.
SetData(InjectionGroup,[BGScale],["NO"],All);
- // Set WILSWA injection group field to scale
SetData(InjectionGroup,[InjGrpName,BGScale],["WILSWA variable load","YES"]);
- // Scale WILSWA from [-4430] to [-4930] = {500MW}
Scale(InjectionGroup, MW, [-4930],Bus);
- }

Script {Part 2}

- Script
- {
- //Reset all injection group scale field to "NO"
`SetData(InjectionGroup,[BGScale],["NO"],All);`
- //Set Upper Columbia scale field to "YES"
`SetData(InjectionGroup,[InjGrpName,BGScale],["Upper Columbia","YES"]);`
- //Scale Upper Columbia from [1901] to [2401] = {500MW}
`Scale(InjectionGroup, MW, [2401],Bus);`
- `EnterMode(powerflow);`
- `solvepowerflow;`
- `solvepowerflow;`
- }

EXAMPLE: SOA $S > N$
scaling WILSWA

PW Scripting Commands

- **Scale (scaletype, basedon, [parameters], ScaleMarker);**

LOAD	MW	[P,Q]	BUS
GEN	FACTOR	[P] (means constant pf)	AREA
INJECTIONGROUP			
BUSSHUNT			

- **Scaletype:** The object type being scaled.
Must be either load, generation, an injection group or a bus shunt

- **Basedon:** MW: parameters are given in MW
FACTOR: parameters a factor to multiply the present values by

- **[Parameters]:** These parameters depend on scaletype...

 - **LOAD:** [MW, MVAR] or [MW]. Do no specify a MVAR value to scale load using a constant power factor.
 - **GEN:** [MW].
 - **INJECTIONGROUP:** [MW,MVAR] or [MW]. Do no specify a MVAR value to scale load using a constant power factor.
 - **BUSSHUNT:** [GMW,BCAPMVAR,BREAMVAR]. The first value scales G shunt values, the second value scales positive (capacitive) B shunt values, and the third value scales negative (reactive) B shunt values.

- **ScaleMarker:** This value specifies whether scale an element's bus, area or zone

 - **BUS:** The elements will be scaled according to the BusScale property of the element's terminal bus
 - **AREA:** The elements will be scaled according to the BGScale property of the element's area. NOTE: It is possible for the area of a load, generator or switched shunt to be different than the terminal bus' area.
 - **ZONE:** The elements will be scaled according to the BGScale property of the element's zone. NOTE: It is possible for the area of a load, generator or switched shunt to be different than the terminal bus' zone.
 - **OWNER:** The elemtns will be scaled according to the BGScale property of the element's owner.

PW Scripting Commands

- **SetData(objecttype,[fieldlist],[valuelist],filter);**
 - **Objecttype:** The object type being set
 - **[fieldlist]:** A list of fields to save
 - **[valuelist]:** A list of values to set the respective fields to
 - **Filter:** There are four options for selecting a filter to use
 - **SetData(...);** no filter is specified.
 - **SetData(...,"filtername");** use the defined filter "filtername" to set data if conditions are met
 - **SetData(...,SELECTED);** set data for all objects whose *selected* field is set to YES
 - **SetData(...,ALL);** set data for all objects of the specified object type