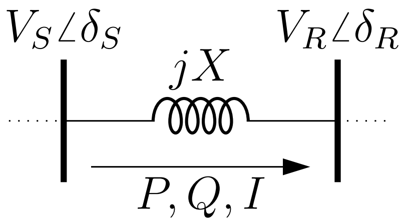
Recent Progress:

1. Noise agent added.
2. Branch Power Flow calculations added.



$$P = \frac{V_R V_S}{X}\sin(\delta_S - \delta_R) \quad (1)$$

$$Q = \frac{V_R}{X}\left(V_S\cos(\delta_S - \delta_R) - V_R\right) \quad (2)$$

$$I = \frac{|P + jQ|}{V_R\sqrt{3}} \quad (3)$$

(Plots on reverse)

3. Generic Machine and Governors added and tested.
4. dyd Parser updated to include MW capacity and percentages.
5. WECC simulation works - takes 6 minutes for 30 second sim time. Generic governors used, islanded objects ignored, tap changers, SVD, and phase shifters enabled, PSLF exponential load changes handled.
6. GitHub updated: `https://github.com/thadhaines/`

Current Tasks:

1. Solidify test cases for validation
2. 'Interesting' Case generation

   Large gov Deadband, fast AGC

   Normal Deadband, adequate AGC (as per FERC requirements)

   Various numbers of BA's
3. Continue to refine BA ACE actions.

   Differentiate between reported ACE and distributed ACE

   Enable FERC requirement checks
4. Update Code flowchart
5. Thesis work

Current Questions:

1. Progress on case data?
2. VAR calculation - Real power and AMPS match, Reactive power off (see reverse)

Future Tasks:

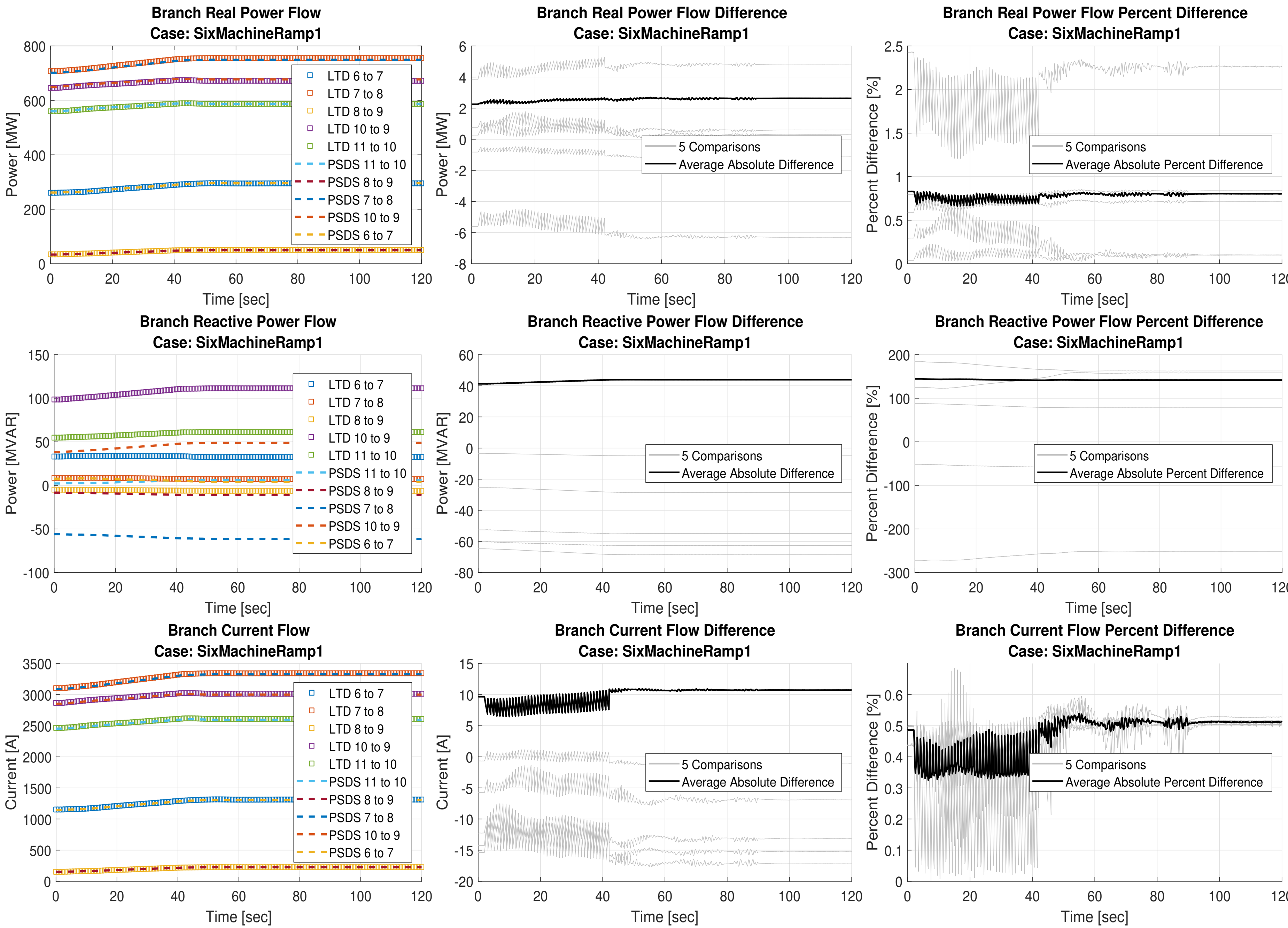
1. Add import mirror / bypass mirror init sequence option to prevent repeated mirror creations.
2. Bring wind into simulation (ramp ungoverned generators?)

Future Work: (not by me)

- Find best/correct way to trip gens in PSLF from python.
- Account for different types of loads better. (exponential load model)
- Work to incorporate Matt's *Suggested Use Cases* into simulation.
  - Add Shunt Group Agent
  - Work to Define Definite Time Controller user input
- Investigate ULTC action.
- Create an agent for every object: ULTC, SVD, Transformer, ...
- Move away from reliance on GE

Matt Requests:

1. Enable multiple dyd files to overwrite / replace previously defined agents/parameters
2. Allow for variable time steps.


Branch Real Power Flow
Case: SixMachineRamp1
Power [MW]
Time [sec]
LTD 6 to 7
LTD 7 to 8
LTD 8 to 9
LTD 10 to 9
LTD 11 to 10
PSDS 11 to 10
PSDS 8 to 9
PSDS 7 to 8
PSDS 10 to 9
PSDS 6 to 7
Branch Real Power Flow Difference
Case: SixMachineRamp1
5 Comparisons
Average Absolute Difference
Branch Real Power Flow Percent Difference
Case: SixMachineRamp1
Percent Difference [%]
Average Absolute Percent Difference
Branch Reactive Power Flow
Case: SixMachineRamp1
Power [MVAR]
Branch Reactive Power Flow Difference
Case: SixMachineRamp1
Branch Reactive Power Flow Percent Difference
Case: SixMachineRamp1
Branch Current Flow
Case: SixMachineRamp1
Current [A]
Branch Current Flow Difference
Case: SixMachineRamp1
Branch Current Flow Percent Difference
Case: SixMachineRamp1

Parsing Results from 2018 WECC case: Note: Dyd contains model information for objects no longer present in .sav - therefore, below values are only a 'ballpark' estimate of what actual model contains.

Table 1: Machine parsing results.

Model Name	Occurrences	MVA Rating	% Of Models	% Of Capacity
genrou	1,823.00	203,122.05	43.05	54.65
gentpj	1,681.00	117,049.60	39.69	31.49
gentpf	587.00	34,533.84	13.86	9.29
gencc	48.00	9,790.80	1.13	2.63
gewtg	52.00	5,528.30	1.23	1.49
genwri	7.00	839.21	0.17	0.23
motor1	37.00	805.46	0.87	0.22
TOTAL	4,235.00	371,669.26	100.00	100.00

Table 2: Prime movers parsing results.

Model Name	Occurrences	MW Cap	% Of Models	% Of Capacity
ggov1	1,315.00	77,961.96	46.06	39.86
ieeeg1	300.00	54,452.11	10.51	27.84
hyg3	320.00	18,947.77	11.21	9.69
hygov4	167.00	7,614.40	5.85	3.89
ieeeg3	137.00	7,403.49	4.80	3.79
hygovr	25.00	6,249.37	0.88	3.20
ggov3	30.00	5,358.32	1.05	2.74
hygov	230.00	5,315.83	8.06	2.72
pidgov	61.00	3,809.77	2.14	1.95
wndtge	33.00	3,783.47	1.16	1.93
gpwscc	62.00	2,398.05	2.17	1.23
tgov1	25.00	1,485.56	0.88	0.76
g2wscc	21.00	458.28	0.74	0.23
gast	37.00	330.68	1.30	0.17
ccbt1	3.00	32.53	0.11	0.02
wndtrb	1.00	0.00	0.04	0.00
lcfb1	88.00	0.00	3.08	0.00
TOTAL	2,855.00	195,601.58	100.00	100.00

Table 3: Wind turbine parsing results.

Model Name	Occurrences	MW Cap	% Of Models	% Of Capacity
regc_a	286.00	18,461.70	19.54	40.29
wt4g	131.00	8,995.08	8.95	19.63
wt3g	112.00	7,633.72	7.65	16.66
wt3e	106.00	4,882.04	7.24	10.65
wt2g	21.00	1,841.24	1.43	4.02
wt2t	19.00	1,224.90	1.30	2.67
wt1g	21.00	1,188.37	1.43	2.59
wt1t	21.00	885.99	1.43	1.93
wt3t	106.00	712.28	7.24	1.55
wtgt_a	35.00	0.00	2.39	0.00
wtgq_a	29.00	0.00	1.98	0.00
wtgp_a	29.00	0.00	1.98	0.00
wtga_a	28.00	0.00	1.91	0.00
wt4t	72.00	0.00	4.92	0.00
wt3p	67.00	0.00	4.58	0.00
wt2p	16.00	0.00	1.09	0.00
wt2e	19.00	0.00	1.30	0.00
wt1p	16.00	0.00	1.09	0.00
repc_a	143.00	0.00	9.77	0.00
reec_a	44.00	0.00	3.01	0.00
exwtg1	5.00	0.00	0.34	0.00
ewtgfc	10.00	0.00	0.68	0.00
TOTAL	1,464.00	45,825.31	100.00	100.00