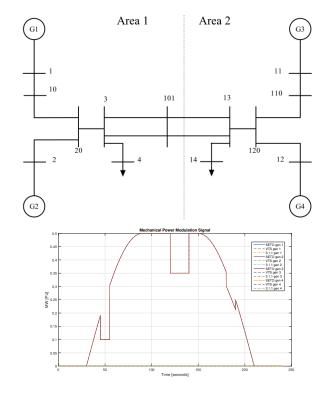
## Scenario



- Kundur 4 machine system packaged with PST
- Constant Z load model
- System has governors, exciters, and PSS.
- Governor of generator being perturbed by pm\_sig removed
- Perturbance was meant to mimic a solar ramp with various situations of cloud cover: (larger plot of pm\_sig on Page 6)

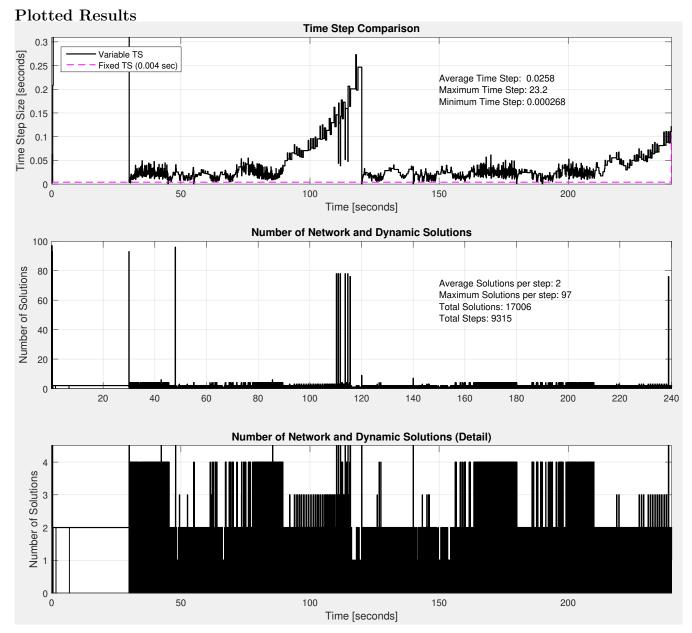
## Summary

- 1. The SETO version is 3.65 times faster than PST 3.1.1
- 2. Using variable time steps allows for a speed up of 14.84 over PST 3.1.1.
- 3. Results from all simulations are very similar.
- 4. Without creating an explicit time block at the beginning of an event, VTS events may not occur at the exact time they are programmed.
- 5. VTS reduces logged data size by  $\approx 4$  times compared to the SETO version.

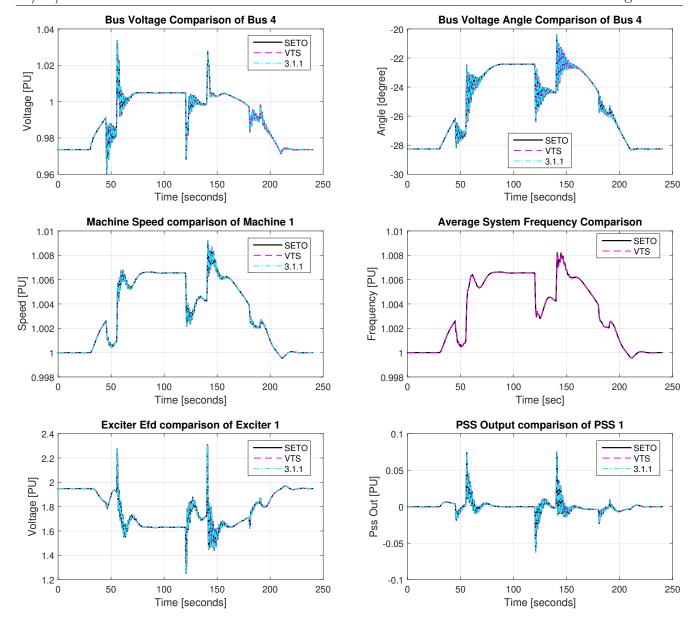
	Step Size [seconds]				Solutions Per Step				
PST Version	Max.	Min.	Ave.	Total Steps	Ave.	Max.	Total Slns.	Sim. Time	Speed Up
3.1.1	4.00E-03	4.00E-03	4.00E-03	59,975	2	2	119,950	916.24	1.00
SETO	4.00E-03	4.00E-03	4.00E-03	59,975	2	2	119,950	250.82	3.65
VTS	2.32E+01	2.68E-04	2.58E-02	9,315	2	97	17,006	61.73	14.84

## NOTE

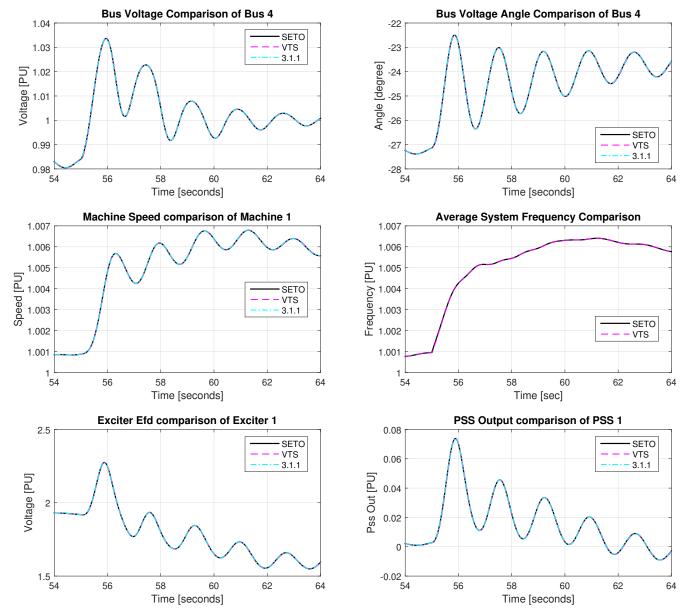
- $\bullet~$  VTS is still 'experimental' and not completely validated/verified.
- Related files are on github in the MT-Tech-SETO\PST\0-examples\extendedTerm folder.



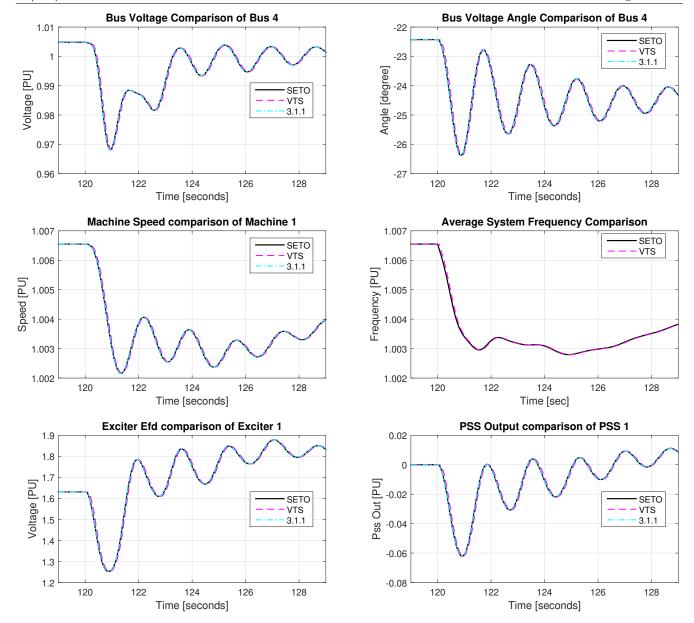
NOTE: Initial time steps before t=30 are much larger than the other time steps (multiple seconds) and are plotted off the axis.



NOTE: 3.1.1 does not calculate Average system Frequency

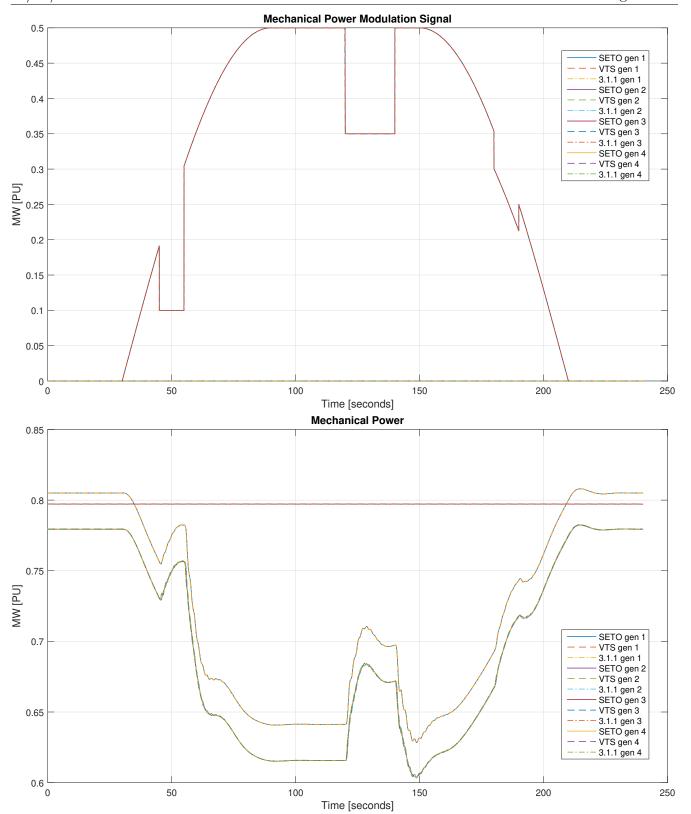


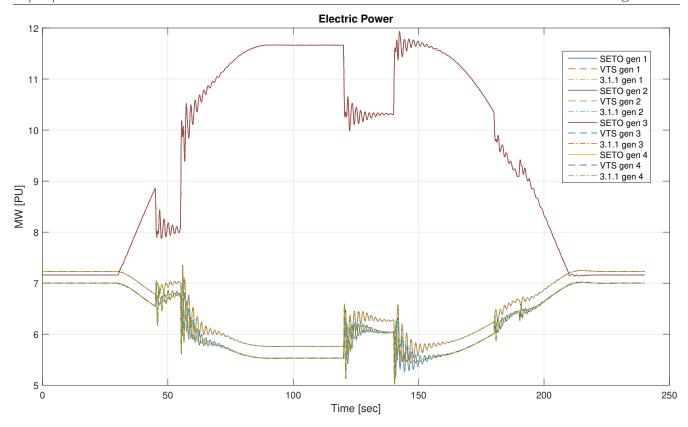
NOTE: 3.1.1 does not calculate Average system Frequency



NOTE: 3.1.1 does not calculate Average system Frequency

VTS events may not occur at exact specified time due to the nature of variable time steps. Breaks in the sw\_con can be created to account for this, however, the variance in time is often relatively small.





Detail of Generators 1, 2, and 5 from t=140 to 150:

