Report

Performance:

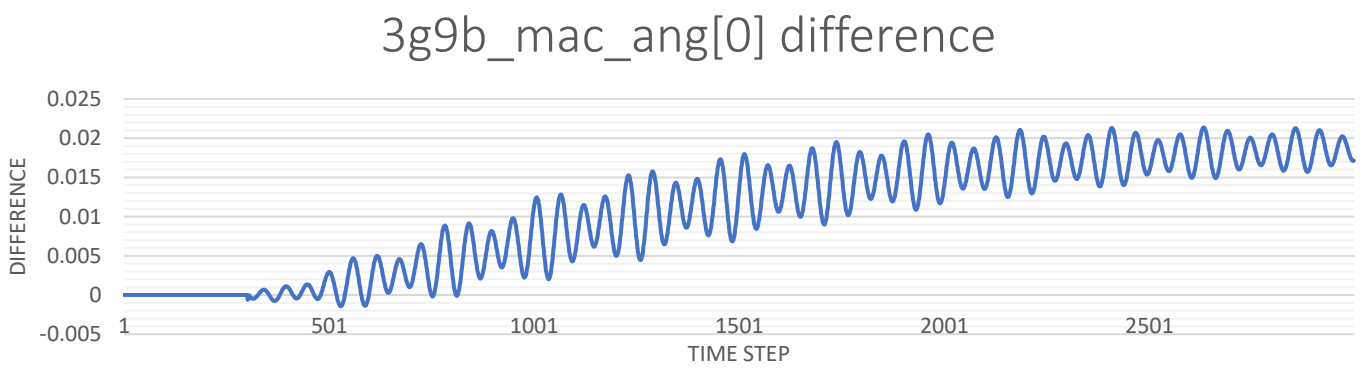
This work was done on Palmetto Cluster (8 cores and 14GB memory) with PGI and GCC compiler, respectively, there was a significant performance boost on integrations between these two methods. However, Palmetto seems run the simulation so fast, resulting in the simulation time cost only contributes a little potion of our total cost (less than 1s for a 30 second simulation), thus, even though it can improve the simulation performance, overall, only tiny boost. An example testing 3000.txt is shown below:

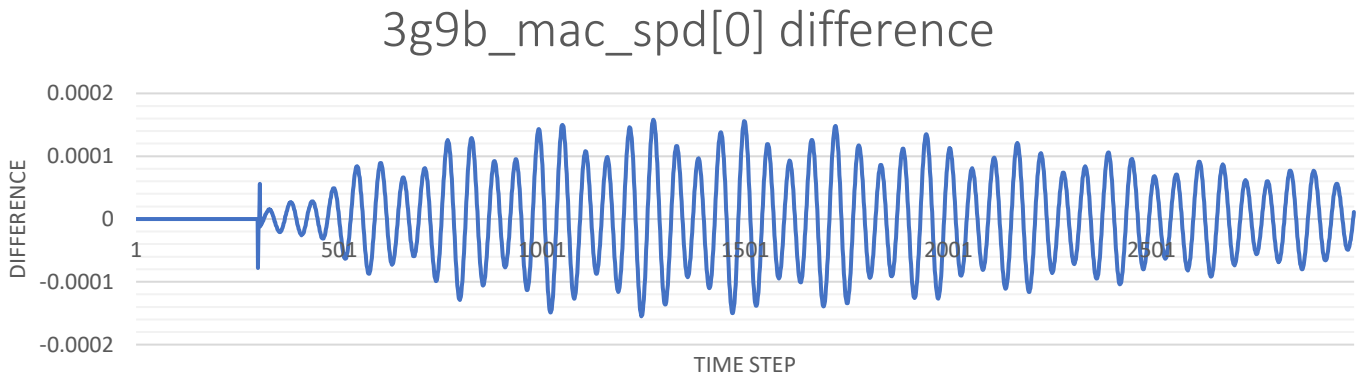
AB with NUM_THREADS=2	ME with NUM_THREADS=2
Y Matrix: 49.7s	Y Matrix: 49.7s
Simulation time: 0.3s	Simulation time: 0.6s
Overall time: 50s	Overall time: 50.3s

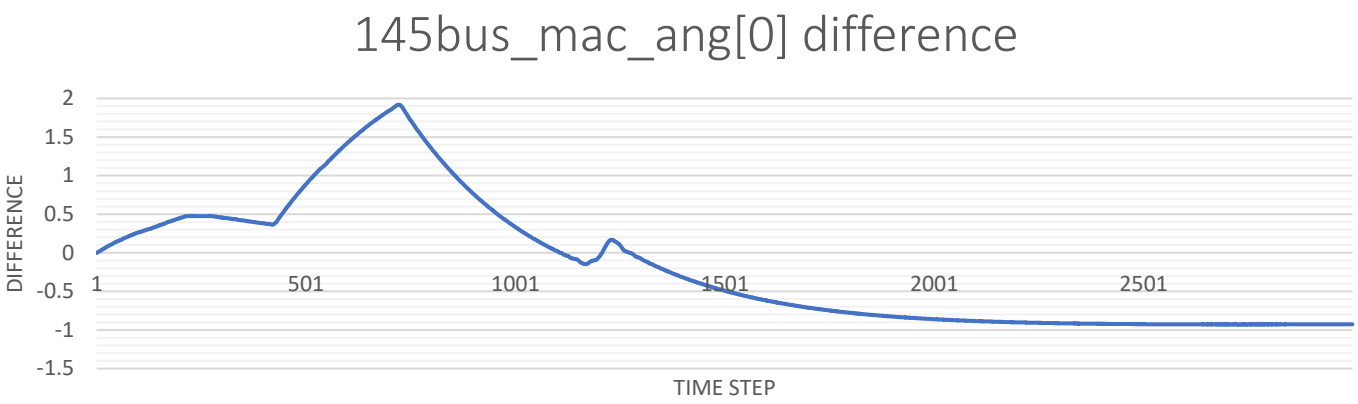
We observe only 0.3 second performance boost when switching the method to AB.

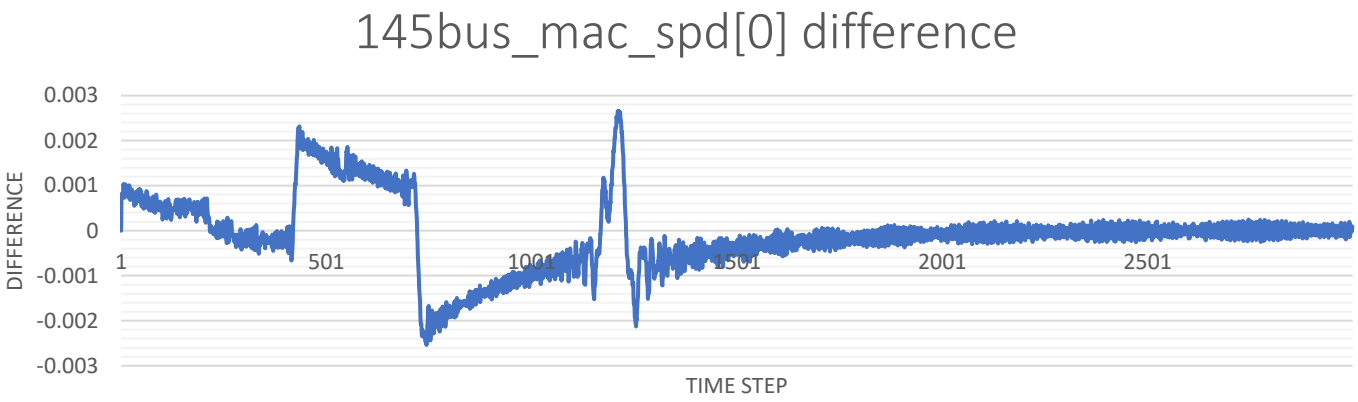
Simulation Results:

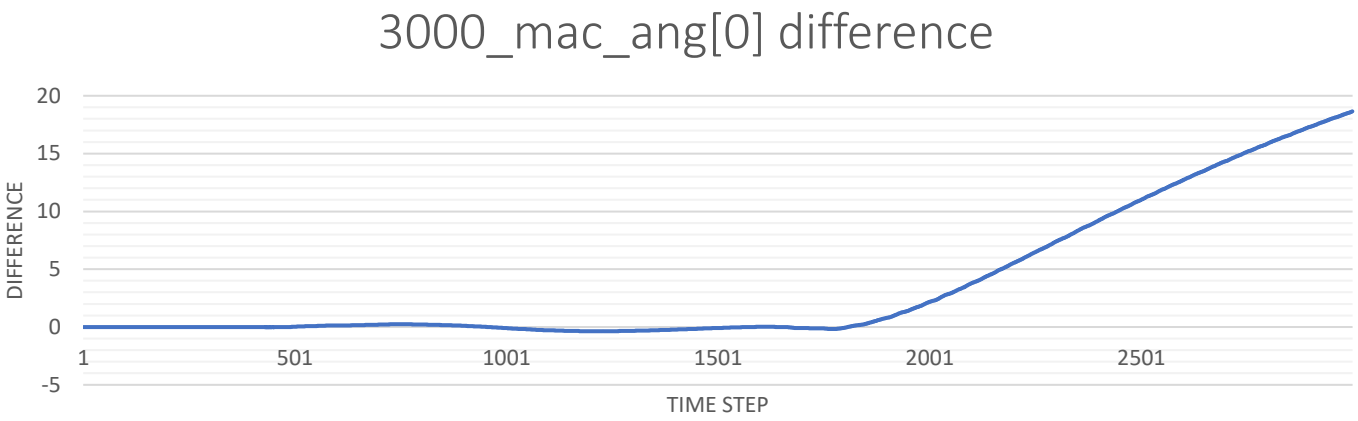
The result differences of computing generator dynamics between these two integration methods are presented.

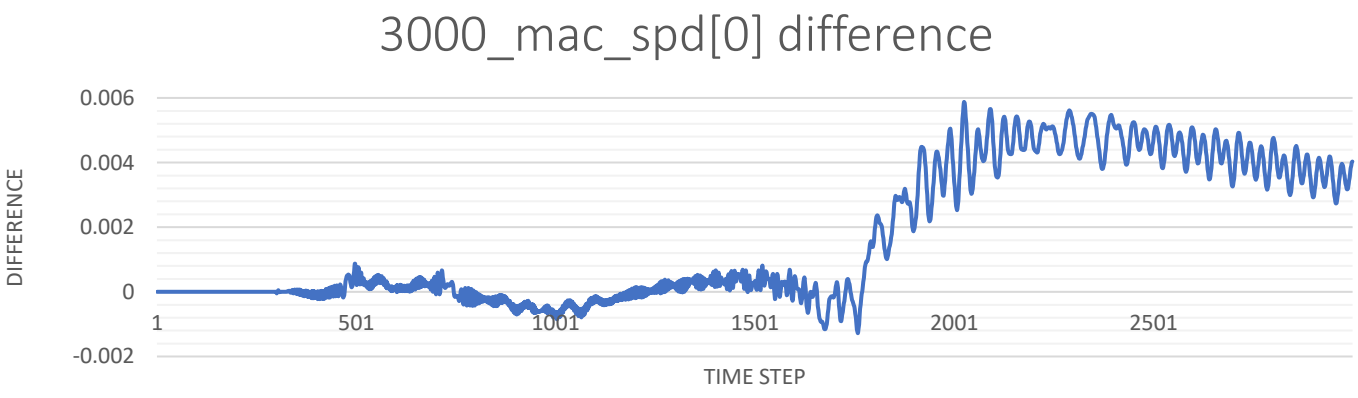





145bus_mac_ang[0] difference
DIFFERENCE
2
1.5
1
0.5
0
-0.5
-1
-1.5
1
501
1001
1501
2001
2501
TIME STEP


145bus_mac_spd[0] difference
DIFFERENCE
0.003
0.002
0.001
0
-0.001
-0.002
-0.003
1
501
1001
1501
2001
2501
TIME STEP


3000_mac_ang[0] difference
DIFFERENCE
20
15
10
5
0
-5
1
501
1001
1501
2001
2501
TIME STEP


3000_mac_spd[0] difference
DIFFERENCE
0.006
0.004
0.002
0
-0.002
1
501
1001
1501
2001
2501
TIME STEP