Test Cases Library format of simulated PMU data

Test Cases Library format is primarily intended for synthetic PMU data generated as a result of time-domain simulation in power systems by using TSAT software and to be used for the methods locating the source of oscillation. The format is exactly the same as is used in TSAT's tool (DSATools Output Analysis) for exporting results of time-domain simulation into plain ASCII .txt file.

The specifics of the Test Cases Library format is that a data set consists of several linked together quantities necessary for an oscillation source locating method. For example, a data set can consist of four files respectively for Current magnitude, Current angle, Bus voltage magnitude and Bus voltage angle. Each file has the same data structure and includes measurements at multiple transmission elements in the network. Each transmission element has all four measurements taken at the same location. Different quantities at the same location can be easily recognized and linked together by the same SignalID in a file header, which is the first row in each file. Space serves as a separator between SignalIDs. The second and following rows contain numerical values of measurements separated by a space. The first column in a file is a time stamp given in seconds and starting from zero.

SignalID generated by TSAT is a string in single quotes. The content of SignalID depends on the type of measurements and has the following structure for voltages and currents:

- For voltage: *'<Bus number>|<Bus name><Bus nominal voltage> '*
- For current: *'<Bus number from>|<Bus name from><Bus from nominal voltage>|<Bus number to>|<Bus name to><Bus to nominal voltage>|<CircuitID>'*

Below are examples of Bus voltage magnitude and Line current angle files opened in Notepad editor

BusVolMag.txt

```
'Time' '4009|BIG EDDY    230.' '4006|BIG EDDY    500.' '6333|BRIDGER     20.0' '
0.000000  1.079998 1.075942 1.033044 1.017717 1.054578 1.055000 1.078703 1.06140
0.033333  1.079925 1.075865 1.033097 1.017679 1.054513 1.054975 1.078632 1.06136
0.066667  1.079945 1.075902 1.033107 1.017737 1.054586 1.054901 1.078657 1.06128
0.100000  1.080048 1.075994 1.033166 1.017723 1.054492 1.054818 1.078757 1.06119
0.133333  1.079983 1.075942 1.033214 1.017824 1.054454 1.054808 1.078693 1.06116
0.166667  1.079997 1.075958 1.033144 1.017786 1.054437 1.054735 1.078709 1.06110
0.200000  1.079992 1.075957 1.033198 1.017912 1.054411 1.054762 1.078705 1.06112
0.233333  1.079931 1.075876 1.033149 1.017706 1.054365 1.054756 1.078637 1.06111
```

LinCurAng.txt

```
'Time' '8001|OLINDA      500.|4001|MALIN       500.|1 ' '3906|ROUND MT    500.|4001|MALIN       500.|1 '
0.000000  96.304176 56.141277 56.141277 -175.481186 -175.481186 -44.788174 155.189362 14.531764 14.53176
0.033333  96.273163 56.198994 56.198994 -175.439667 -175.439667 -44.504612 155.197617 13.249187 13.24918
0.066667  95.677338 56.142372 56.142372 -175.601318 -175.601318 -44.647869 155.206192 14.266190 14.26619
0.100000  95.792038 56.250019 56.250019 -175.643814 -175.643814 -44.572392 155.174728 14.127253 14.12725
0.133333  95.216347 56.014359 56.014359 -175.793106 -175.793106 -44.541691 155.224503 13.301133 13.30113
0.166667  95.819733 55.890884 55.890884 -175.616608 -175.616608 -44.570282 155.185333 12.859634 12.85963
0.200000  96.746513 56.258476 56.258476 -175.467926 -175.467926 -44.465221 155.210693 13.865014 13.86501
0.233333  95.836639 56.121433 56.121433 -175.637115 -175.637115 -44.389969 155.196823 13.557522 13.55752
0.266667  96.511398 56.178032 56.178032 -175.611816 -175.611816 -44.115894 155.149628 13.993240 13.99324
0.300000  97.027901 56.423630 56.423630 -175.706726 -175.706726 -44.223289 155.157455 13.338387 13.33838
```

File names can be arbitrary, however the recommended names are LinCurMag.txt, LinCurAng.txt, BusVolMag.txt, BusVolAng.txt, which are consistent with the provided Matlab code (download link: http://web.eecs.utk.edu/~kaisun/Oscillation/download/TestCasesLibrary_LoadData2Matlab.zip) reading these files in the Test Cases Library format into Matlab work space.

Other quantities such as generator rotor angle or speed can be also saved on this format.