**IEEE-123-node-single-phase-powerflow**

This repository contains the power flow comparison for single phase IEEE 123 node system.

**IEEE123singlephase\_base**

This folder contains the power flow comparison using Branch flow model (BFM) and OpenDSS for IEEE-123 node system. The folder ‘IEEE123singlephase\_baseMatlab’ has linedata.txt which provides the impedance for each line in the system. First column is ‘from’ bus, second column is ‘to’ bus, third is ‘R’ value and fourth is ‘X’ value. The powerdata.txt provides the rated power at each node of the distribution system. First column is ‘node number’, second is ‘active power’, third is ‘reactive power’, fourth is rated reactive power for ‘capacitor’, fifth is rated ‘DG rating’. The ‘singlephaselin.m’ is the linear BFM to solve linear power flow, ‘nonlinpowerflow.m’ is the nonlinear BFM to solve nonlinear power flow and ‘eqcons.m’ is the nonlinear equality constraints. The ‘IEEE123singlephase\_baseOpenDSS’ is the OpenDSS folder. Here, ‘IEEE123SinglePh.dss’ is the OpenDSS model for the distribution system. The file ‘IEEE123singlephase\_basePowerflowvalidationOpenDSS\_base.m’ is the interface between the Matlab and OpenDSS to solve power flow.The comparison of power flow results is shown in ‘powerflowcomparision\_base.xlsx’ file.

**IEEE123singlephase\_DG10**

Here 10% of the load node in the distribution system is populated with DG. The rated power of DG is same as the rated load at the node and the smart inverter rating is 120% of the rated power. All other file names are similar to base file.

**IEEE123singlephase\_DG30**

Here 30% of the load node in the distribution system is populated with DG. The rated power of DG is same as the rated load at the node and the smart inverter rating is 120% of the rated power. All other file names are similar to base file.

**IEEE123singlephase\_DG50**

Here 10% of the load node in the distribution system is populated with DG. The rated power of DG is same as the rated load at the node and the smart inverter rating is 120% of the rated power. All other file names are similar to base file.

**IEEE123\_1P\_VR\_C\_base**

This folder contains the power flow comparison using Branch flow model (BFM) and OpenDSS for IEEE-123 node system. The folder ‘IEEE123\_1P\_4VR\_4C’ has the OpenDSS and Matlab model with all the four voltage regulators and capacitor banks. The ‘IEEE123\_1P\_4VR\_4C\_baseMatlab’ has ‘linedata.txt’ which provides the impedance for each line in the system. First column is from bus, second column is to bus, third is R value and fourth is X value. The powerdata.txt provides the rated power at each node of the distribution system. First column is node number, second is active power, third is reactive power, fourth is rated power for capacitor, fifth is rated DG rating. The ‘singlephaselin.m’ is the linear BFM to solve linear power flow, ‘nonlinpowerflow\_1P\_VR\_C.m’ is the nonlinear BFM and ‘eqcons.m’ is the nonlinear equality constraints. The folder ‘IEEE123\_1P\_4VR\_4C\_baseOpenDSS’ is the OpenDSS folder. The ‘IEEE123SinglePh.dss’ is the OpenDSS model for the distribution system and ‘IEEE123\_1P\_VR\_C\_basePowerflowvalidationOpenDSS\_base.m’ is the interface between the Matlab and OpenDSS for solving power flow. The comparison between the power flow results for different tap positions and capacitor switch status are shown in ‘powerflowcomparision\_Base.xlsx‘ file in the folder.

**IEEE123\_1P\_VR\_C \_DG10**

Here 10% of the load node in the distribution system is populated with DG. The rated power of DG is same as the rated load at the node and the smart inverter rating is 120% of the rated power. All other file names are similar to base file.

**IEEE123\_1P\_VR\_C \_DG30**

Here 30% of the load node in the distribution system is populated with DG. The rated power of DG is same as the rated load at the node and the smart inverter rating is 120% of the rated power. All other file names are similar to base file.

**IEEE123\_1P\_VR\_C \_DG50**

Here 10% of the load node in the distribution system is populated with DG. The rated power of DG is same as the rated load at the node and the smart inverter rating is 120% of the rated power. All other file names are similar to base file.

‘Node\_correspondance.txt’ file has node numbering in OpenDSS and Matlab. Column one corresponds to node numbering in OpenDSS and column two has corresponding node in Matlab. For visualization also look into the slides.