**Libraries in python**

**1. PyPSA**

PyPSA is an open source toolbox for simulating and optimising modern power and energy systems that include features such as conventional generators and links with unit commitment, variable wind and solar generation, storage units, coupling to other energy sectors, and mixed alternating and direct current networks. PyPSA is designed to scale well with large networks and long time series. 4

(<https://pypsa.readthedocs.io/en/latest/power_flow.html>)

Power flow applications

**2. Pandapower**

Pandapower builds on the data analysis library pandas and the power system analysis toolbox PYPOWER to create an easy to use network calculation program aimed at automation of analysis and optimization in power systems. (http://www.pandapower.org/about/#modeling)

Power Flow :

The pandapower power flow solver is based on the Newton-Raphson method. The implementation was originally based on PYPOWER, but has been improved with respect to robustness, runtime and usability.

**3.GridCal**

GridCal is an open-source Python library for power system analysis, including power flow calculations, state estimation, and optimal power flow. It's designed for research and educational purposes.

(https://gridcal.readthedocs.io/en/latest/)

Power Flow :

* Newton-Raphson
* Levenberg-Marquardt
* Fast Decoupled
* DC approximation
* Linear AC Power Flow
* Holomorphic Embedding
* Post Power Flow (Loading and Losses)
* Continuation power flow
* Distributed Slack

4. **PYEEG (Python for Energy Economics and Power System Analysis)**

PYEEG is a Python package designed for energy economics and power system analysis. It includes modules for power flow calculations and market clearing simulations.

(https://pyeeg.sourceforge.net/)

**5. OpenDSS**

OpenDSS is an electric power distribution system simulator (DSS) designed to support distributed energy resource (DER) grid integration and grid modernization.

**6. Siumulink**

can perform a power-flow, or load-flow, analysis for an AC, DC, or mixed AC and DC electrical power transmission system modeled using the Simscape three-phase electrical domain. A load-flow analysis allows you to determine the voltage magnitudes, voltage phase angles, active power, and reactive power of the electrical system in steady-state operation. (https://www.mathworks.com/help/sps/ug/perform-a-load-flow-analysis-using-simscape-electrical.html)