1 Description of Modules

1.1 Power Flow

1.2 Sparse Power Flow

For Transmission Networks, most of the commonly used data structures for analyses are sparse in nature, i.e. most of their elements are zero. Data Structures such as Y_{Bus}, Jacobian J, the LU Factors of the Jacobian LU are sparse in nature. The sparsity only increases as the size of the system increases. ¡Insert some values of sparsity for different transmission systems¿. This sparsity can be exploited for faster computation and smaller data storage requirements, when performing analysis w.r.t. any aspect of Power Systems. For example, using taking advantage of the sparsity of the above mentioned data structures, along with other schemes such as parallel computation and Single Instruction Multiple Data (SIMD) operations, the authors of [1] were able to perform very fast Newton Raphson Power Flow for large transmission systems.

1.3 Continuation Power Flow

1.4 State Estimation

1.5 Optimal Power Flow

1.6 CDF Parser

References

[1] A. Ahmadi, M. C. Smith, E. R. Collins, V. Dargahi, and S. Jin, "Fast Newton-Raphson Power Flow Analysis Based on Sparse Techniques and Parallel Processing," *IEEE Trans. Power Syst.*, vol. 37, no. 3, pp. 1695–1705, Sep. 2021.