**DATASETS USED FOR THE RESEARCH**

The research study was carried out by examining three (3) different IEEE synthetic transmission networks (14, 30, and 118 Bus system network).

1. **CASE 1: IEEE 14-Bus system network**

The network data were obtained from the studies conducted by *(Gautam & Mithulananthan, 2007; Ogunwole & Krishnamurthy, 2022)*. The network consists of 14 buses, 20 interconnected lines, and 5 generators. The comprehensive information on the system network data (Bus data, line data, generator data, load data, and line limit data) are provided in the attached Excel file Table 1 – 3 *(Adewolu, 2020)*. Below is the single-line diagram for the considered IEEE 14-Bus system network.

A diagram of a circuit

Description automatically generated

**Figure 1:** IEEE 14-Bus single line diagram.

1. **CASE 2: IEEE 30-Bus system network**

The network statistics were acquired from *(Adewolu, 2020; Ogunwole & Krishnamurthy, 2022)*. The network consists of 30 buses, 41 interconnected lines, and 6 generators. The comprehensive information on the system network data (Bus data, line data, generator data, load data, and line limit data) are provided in the attached Excel file Table 4 – 6 *(Nguyen, 2017).* Below is the single-line diagram for the considered IEEE 30-Bus system network.

A diagram of a machine

Description automatically generated

**Figure 2:** IEEE 30-Bus single line diagram.

1. **CASE 3: IEEE 118-Bus system network**

The system is described in depth by *(Blumsack, 2006; Ogunwole & Krishnamurthy, 2022)*. The system comprises a total of 118 buses, 179 interconnecting lines, and 54 generators. The comprehensive information on the system network data (Bus data, line data, generator data, load data, and line limit data) are provided in the attached Excel file Table 7 – 9 *(Nguyen, 2017)*. Below is the single-line diagram for the considered IEEE 30-Bus system network.

Diagram, schematic

Description automatically generated

**Figure 3:** IEEE 118-Bus single line diagram.

1. **References**
2. Gautam, D. & Mithulananthan, N. 2007. Locating distributed generator in the LMP-based electricity market for social welfare maximization. Electric Power Components and Systems, 35(5): 489–503.
3. Ogunwole, E.I. & Krishnamurthy, S. 2022. Transmission Congestion Management Using Generator Sensitivity Factors for Active and Reactive Power Rescheduling Using Particle Swarm Optimization Algorithm. *IEEE Access*, 10: 122882–122900.
4. Adewolu, B.O. 2020. Enhancement of Deregulated and Restructured Power Network Performance with Flexible Alternating Current Transmission Systems Devices, Discipline of Electrical, Electronic and Computer Engineering, University of KwaZulu-Natal, Durban. South Africa.
5. Blumsack, S. 2006. Network Topologies and Transmission Investment Under Electric-Industry Restructuring.
6. Nguyem, P.K. 2017. Economic planning and operation in Electric Power System Using Meta-heuristics based on Cuckoo Search Algorithm, Regional Environment System, Shibaura Institute of Technology.