APPENDIX

1. **33-Bus Distribution System Data**

* **Base MVA** = 10
* **Base kV** = 12.66

**Table 1:** Line and Load Data for 33-Bus Test System

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sending end node** | **Receiving end node** | **Branch Parameters** | | **Nominal load at receiving end** | |
| **R (ohms)** | **X (ohms)** | **P**  **(kW)** | **Q**  **(kvar)** |
|  |
| 1 | 2 | 0.0922 | 0.0470 | 100 | 60 |  |
| 2 | 3 | 0.4930 | 0.2511 | 90 | 40 |  |
| 3 | 4 | 0.3660 | 0.1864 | 120 | 80 |  |
| 4 | 5 | 0.3811 | 0.1941 | 60 | 30 |  |
| 5 | 6 | 0.8190 | 0.7070 | 60 | 20 |  |
| 6 | 7 | 0.1872 | 0.6188 | 200 | 100 |  |
| 7 | 8 | 0.7114 | 0.2351 | 200 | 100 |  |
| 8 | 9 | 1.0300 | 0.7400 | 60 | 20 |  |
| 9 | 10 | 1.0440 | 0.7400 | 60 | 20 |  |
| 10 | 11 | 0.1966 | 0.0650 | 45 | 30 |  |
| 11 | 12 | 0.3744 | 0.1238 | 60 | 35 |  |
| 12 | 13 | 1.4680 | 1.1550 | 60 | 35 |  |
| 13 | 14 | 0.5416 | 0.7129 | 120 | 80 |  |
| 14 | 15 | 0.5910 | 0.5260 | 60 | 10 |  |
| 15 | 16 | 0.7463 | 0.5450 | 60 | 20 |  |
| 16 | 17 | 1.2890 | 1.7210 | 60 | 20 |  |
| 17 | 18 | 0.7320 | 0.5740 | 90 | 40 |  |
| 2 | 19 | 0.1640 | 0.1565 | 90 | 40 |  |
| 19 | 20 | 1.5042 | 1.3554 | 90 | 40 |  |
| 20 | 21 | 0.4095 | 0.4784 | 90 | 40 |  |
| 21 | 22 | 0.7089 | 0.9373 | 90 | 40 |  |
| 3 | 23 | 0.4512 | 0.3083 | 90 | 50 |  |
| 23 | 24 | 0.8980 | 0.7091 | 420 | 200 |  |
| 24 | 25 | 0.8960 | 0.7011 | 420 | 200 |  |
| 6 | 26 | 0.2030 | 0.1034 | 60 | 25 |  |
| 26 | 27 | 0.2842 | 0.1447 | 60 | 25 |  |
| 27 | 28 | 1.0590 | 0.9337 | 60 | 20 |  |
| 28 | 29 | 0.8042 | 0.7006 | 120 | 70 |  |
| 29 | 30 | 0.5075 | 0.2585 | 200 | 600 |  |
| 30 | 31 | 0.9744 | 0.9630 | 150 | 70 |  |
| 31 | 32 | 0.3105 | 0.3619 | 210 | 100 |  |
| 32 | 33 | 0.3410 | 0.5302 | 60 | 40 |  |

1. **10-Bus Distribution System Data**

* **Base MVA** = 10
* **Base kV** = 23

**Table 2:** Line and Load Data for 10-Bus Test System

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sending Node** | **Receiving Node** | **Branch Parameters** | | **Nominal Load at Receiving Node** | |
| **R (ohms)** | **X (ohms)** | **P**  **(kW)** | **Q**  **(kvar)** |
|  |
| 1 | 2 | 0.1233 | 0.4127 | 1840 | 460 |  |
| 2 | 3 | 0.0140 | 0.6051 | 980 | 340 |  |
| 3 | 4 | 0.7463 | 1.2050 | 1790 | 446 |  |
| 4 | 5 | 0.6984 | 0.6084 | 1598 | 1840 |  |
| 5 | 6 | 1.9831 | 1.7276 | 1610 | 600 |  |
| 6 | 7 | 0.9053 | 0.7886 | 780 | 110 |  |
| 7 | 8 | 2.0552 | 1.1640 | 1150 | 60 |  |
| 8 | 9 | 4.7953 | 2.7160 | 980 | 130 |  |
| 9 | 10 | 5.3434 | 3.0264 | 1640 | 200 |  |