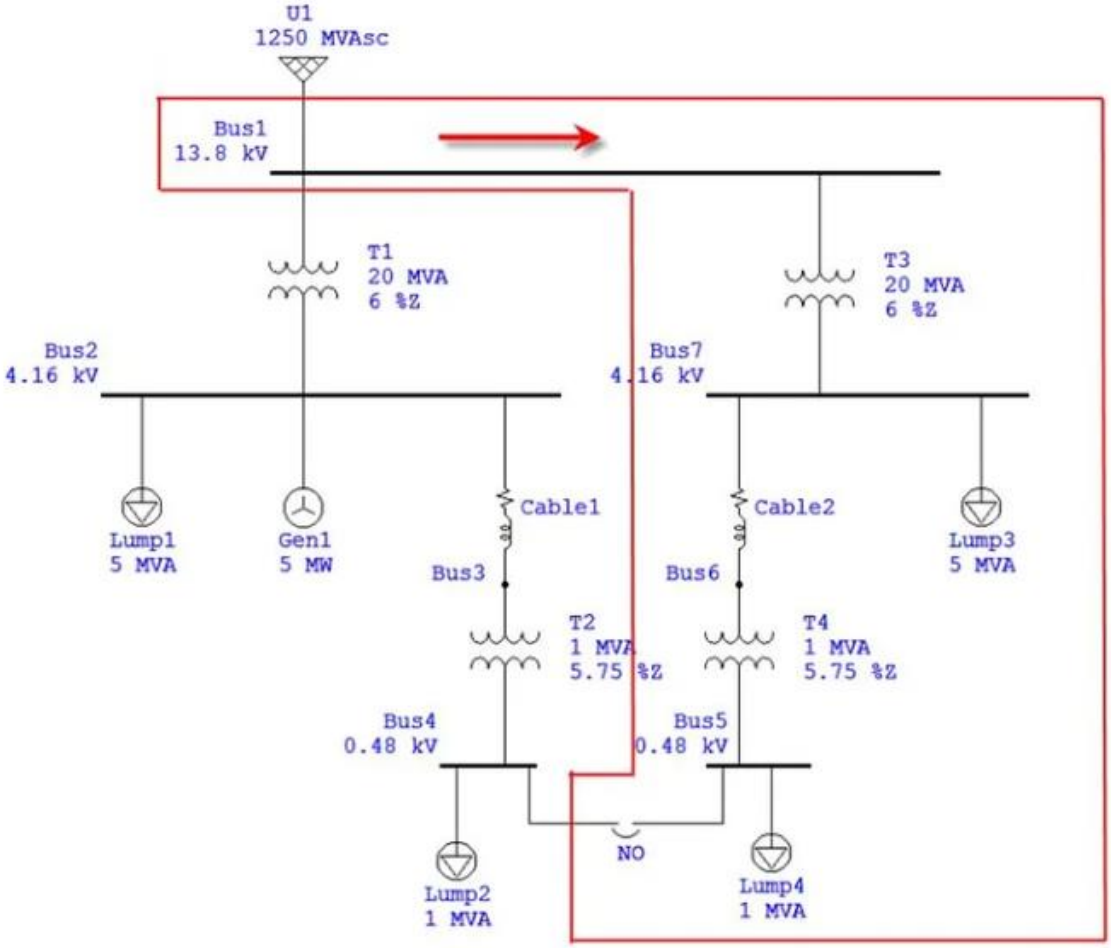
Load flow Study.

In a 3-phase ac power system, active and reactive power flows from the generating stations to the load through different network buses and branches (transmission lines). Active power P and reactive power Q is supplied by generators at generator buses. Active power is drawn by loads from load buses. Reactive power Q is supplied or drawn from the load buses by shunt compensation elements (shunt capacitors, reactor elements, static VAR system). The flow of active and reactive power is called the power flow or load flow. The voltages of buses and their phase angles are affected by the power flow and vice-versa.

Power flow studies provide a systematic mathematical approach for determination of various bus voltages, their phase angles, active and reactive power flow through different branches, generators and loads under steady state conditions. The power flow study in a power system constitutes a study of paramount importance.

Load flow studies are carried out to study short circuit conditions for any interconnected power system. These are also required for planning the operation of power systems under existing conditions, its improvement and future expansion. Such studies facilitate us in determination of best size as well as the most favourable locations for the power capacitors both for power factor improvement and also for raising the network voltages.

The main information obtained from load flow studies comprises the magnitudes and phase angles of load bus voltages, reactive power at generator buses, active and reactive power flow in transmission lines, other variables being specified. Such information is essential for the continuous monitoring of the current state of the system and for analysis of the effectiveness of alternative plans for future system expansion to meet the increased load demand.


U1
1250 MVAsc
Bus1
13.8 kV
T1
20 MVA
6 %Z
T3
20 MVA
6 %Z
Bus2
4.16 kV
Bus7
4.16 kV
Lump1
5 MVA
Gen1
5 MW
Cable1
Cable2
Lump3
5 MVA
Bus3
Bus6
T2
1 MVA
5.75 %Z
T4
1 MVA
5.75 %Z
Bus4
0.48 kV
Bus5
0.48 kV
NO
Lump2
1 MVA
Lump4
1 MVA