Buses are divided into three types-

(i) Load bus

(ii) Generator bus

(iii) Slack bus

- For load bus, real power(P) & reactive power Q are known but magnitude & phase angle of bus voltage is unknown.
- Generator bus (voltage controlled bus) is connected with generator. Therefore bus voltage corresponds to generation voltage & active power generation corresponding to generator rating is specified for this bus.
- Slack bus (swing or reference bus) doesn't exist in real life. To supply power loss, an extra generator bus is considered for which bus magnitude & voltage is specified.

Algorithm of NR method-

(i) for Y-bus matrix

(ii) Assum initial bus voltage mag. $|V_i|$

& phase angle σ_i. $|V_1| = 1$ pu & $\sigma_1 = 0$ rad.

(iii) Set iteration count 0.

(iv) Calculate real & reactive power for each load buses.

(v) Compute errors for each load bus.

(vi) Calculate Jacobian matrix

(vii) Obtain value of $\Delta|V_i|$ & $\Delta\sigma_i$

(viii) Find value of $|V_i|$ & σ_i & next iteration starts

(ix) Continue until scheduled error for all load buses.

(x) Calculate line flows & power at slack bus.