NEWTON RAPHSON METHOD

Iterative solution using Newton-Raphson method – Algorithm

Step 1: Assume a suitable solution for all buses except the slack bus.

Let Vp = a+j0 for P = 2,3,……n V1 = a+j0

Step 2 : Set the convergence criterion = ε0

Step 3 : Set iteration count K= 0

Step 4 : Set bus count P = 2

Step 5 : Calculate Pp and Qp using n

$$Pp = \Sigma \{ ep(epGpq+fpBqp)+fp(fpGpq - epBpq)\} \quad q=1 \; n$$

$$Qp = \Sigma \{ fp(epGpq+fpBqp)+ep(fpGpq - epBpq)\} \quad q=1$$

Step 6 : Evaluate ΔPPK = Pspec - PPK

Step 7 : Check if the bus is the question is a PV bus. If yes compare QPK with the limits.

If it exceeds the limit fix the Q value to the corresponding limit and treat the bus as PQ for that iteration and go to next step (or) if the lower limit is not violated

evaluate $|\Delta VP|2 = |\ Vspec|2 - |VPK|2$ and go to step 9

Step 8: Evaluate ΔQPK = Qspec - QPK

Step 9 : Advance bus count P = P+1 and check if all buses taken in to account if not go to step 5

Step 10 : Determine the largest value of $|\Delta VP|2$

Step 11: If ΔVP < ε go to step 16

Step 12: Evaluate the element of Jacobin matrices J1, J2, J3, J4, J5 and J6

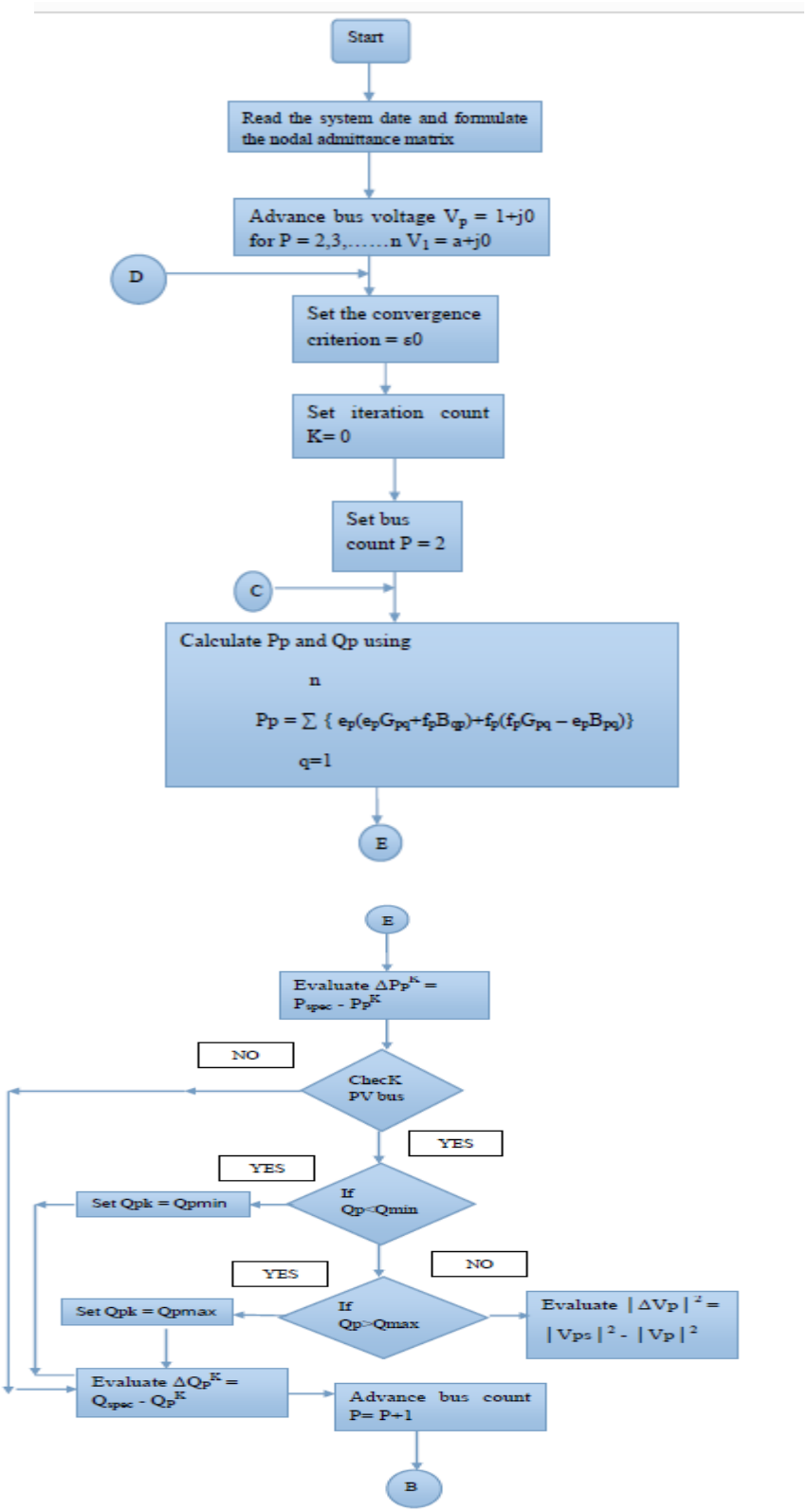
Step 13: Calculate ΔePK and ΔfPK

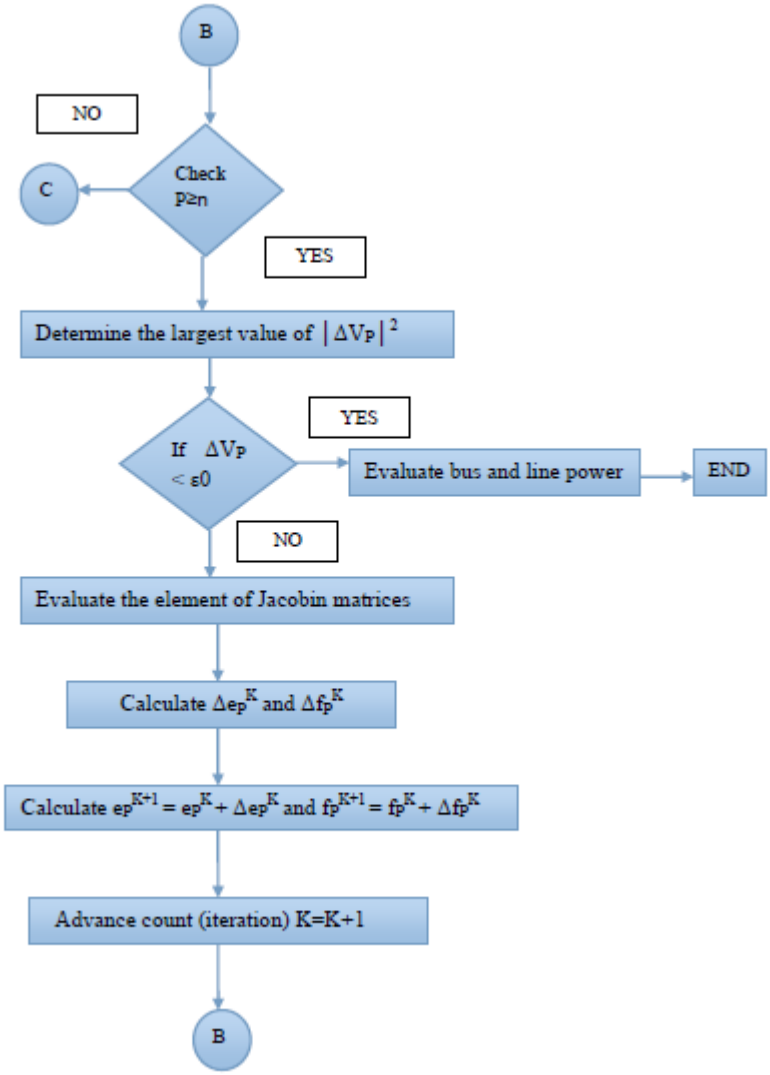
Step 14: Calculate ePK+1 = ePK + ΔePK and fPK+1 = fPK + ΔfPK

Step 15 : Advance count (iteration) K=K+1 and go to step 4

Step 16: Evaluate bus and line power and print the result

Iterative solution using Newton-Raphson method – Flow chart





Advantages and disadvantages of N.R method

Advantages:

Faster, more reliable and results are accurate, require less number of iterations;

Disadvantages:

Program is more complex, memory is more complex.