**Power System-II Lab (EEN15103)**

**Experiment 06**

**Aim: To perform load flow analysis of a radial distribution network using the Forward Backward**

**Sweep method and determine the bus voltages, branch currents, and power losses in the system.**

**Software Requirements: MATLAB 20xx**

**Theory:**

**Backward and forward sweep method for load flow is an iterative technique in which, at each**

**iteration two computational stages are performed. With the aid of two sets of recursive equations,**

**load flow of a single source network can be solved iteratively. The first set of equations for**

**calculation of the power flow through the branches starting from the last branch and proceeding**

**in backward direction towards the root node. The second set of equations is used for calculation**

**of the voltage magnitude and phase angle of each node starting from the root node and**

**proceeding in the forward direction towards the last node.**

**Backward Sweep Method**

**In backward sweep, branch current is updated in each section by taking into consideration the**

**previous iteration voltages at each node. It starts from the branches in the last node and moves**

**towards the branches connected to the root node. The updated effective power flow in each**

**branch is obtained in the backward propagation computation by considering the node voltages of**

**previous iterations. It means that the voltage values obtained in the forward path are held**

**constantduringthebackwardpropagationandupdatedpowerflows in each branch are**

**transmitted backward along the feeder using the backward path. This indicates that the backward**

**propagation starts at the extreme end node and proceeds towards the source node.**

**Forward Sweep Method**

**In the Forward Sweep, updated bus voltages are calculated beginning from the slack bus and**

**progressing toward the end nodes, using the previously obtained branch currents and applying**

**Kirchhoff’s voltage law. These two steps are repeated iteratively until the difference between**

**successivevoltageprofilesfallswithin**a**predefinedtolerance.Themethod**is**simple,**

**computationally efficient, and well-suited for analyzing steady-state operating conditions of**

**distribution systems.**

**Successive iteration is obtained by comparing the calculated voltages in previous and present**

**iterations. The convergence can be achieved if the voltage mismatch is less than the specified**

**tolerance i.e. 0.01. Otherwise new effective power flows in each branch are evaluated through**

**backward sweep with the present evaluated voltages and then the procedure is repeated until the**

**solution is converged.**

**SubCode:EE22373**

**Object:Write the MATLAB code**for**BackwordForword SweepMethodof load flow in**

d**istributionline.**

**S.No.From BusTo Bus**R**esistancein ohmReactance in ohm**

112**0.2790.015**

223**0.4440.439**

334**0.8640.751**

445**0.8640.751**

536**1.3740.774**

**Bus No.Active Power in kWReactive Power in kVA**R

100

200

3**1572174**

4**1936312**

5**189**63

6**1336112**

**Algorithm of Backword**–**Forwordsweepmethodof Load flow.**

**Step**1:**Initialization of Voltage**

0

𝑉=𝑉+𝑗0………**for allj = 2,3**…………N

𝑗𝑠

**Step**2:**Iterationcountinitialization k= 1**

𝑃+𝑗𝑄

(𝑘)

𝐿𝑗𝐿𝑗

**Step**3:𝐼=**𝑐𝑜𝑛𝑗**()……**… for allj = 2,3**………**…N**

(𝑘−1)

𝑗

𝑉

𝑗

**Step**4:**Backword sweep (Find out Branch Curren**t)

(𝑘)(𝑘)

𝐼=𝐼+∑𝑜𝑓𝑎𝑙𝑙𝑡ℎ𝑒**𝑐𝑢𝑟𝑟𝑒𝑛𝑡**𝑜𝑓**𝑏𝑟𝑎𝑛𝑐**ℎ𝑒𝑠**𝑒𝑚𝑎𝑛𝑎𝑡𝑒𝑑𝑓𝑟𝑜𝑚𝑏𝑢𝑠**𝑛

**𝑚𝑛**𝑛

**Step**5:**Forword sweep (Voltage of each bus**)

(𝑘)(𝑘)(𝑘)

𝑉=𝑉−𝑍𝐼……**… for allj = 2,3**………**…N**

𝑛𝑚**𝑚𝑛𝑚𝑛**

(𝑘)(𝑘)(𝑘−1)

**Step**6:𝑒=|𝑉−𝑉|……**… for allj = 2,3**………**…N**

𝑗𝑗𝑗

(𝑘)(𝑘)(𝑘)(𝑘)

**Step**7:𝑒=**max**(𝑒,𝑒,…………..,𝑒)

**𝑚𝑎𝑥**

23𝑁

(𝑘)

**Step 8**: if𝑒≤∈(**𝑡𝑜𝑙𝑒𝑟𝑎𝑛𝑐𝑒**)**Print Results**

**𝑚𝑎𝑥**

Else**update the iteration countk = k+1,thengo to step 3.**