

4.1 Method 1: Simplified DistFlow Method

Estimation of Power Flow

We can simplify the DistFlow branch equations, Eq.(1) by noting that the quadratic terms in the equations represent the losses on the branches and hence they are much smaller than the branch power terms P_i and Q_i . Therefore, by dropping these second order terms we can get a new set of branch equations of the following form.

$$P_{i+1} = P_i - P_{Li+1} \quad (5.i)$$

$$Q_{i+1} = Q_i - Q_{Li+1} \quad (5.ii)$$

$$V_{i+1}^2 = V_i^2 - 2(r_i P_i + x_i Q_i) \quad (5.iii)$$

Since the network is radial, the solution for the simplified DistFlow equations can be obtained easily; for a radial network of the type shown in Fig.3, the solution is of the following form.

$$P_{i+1} = \sum_{k=i+2}^n P_{Lk} \quad (6.i)$$

$$Q_{i+1} = \sum_{k=i+2}^n Q_{Lk} \quad (6.ii)$$

$$V_{i+1}^2 = V_i^2 - 2(r_i P_i + x_i Q_i) \quad (6.iii)$$