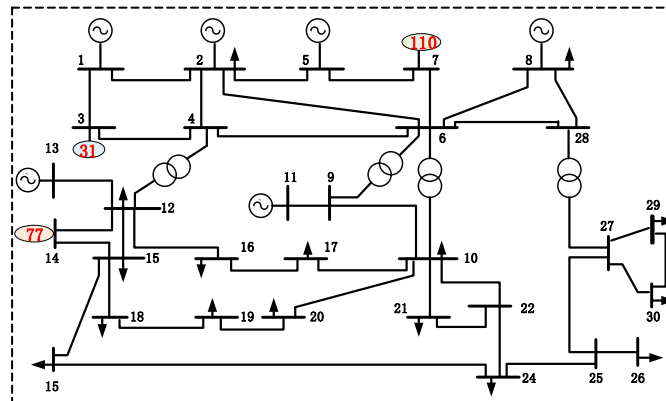
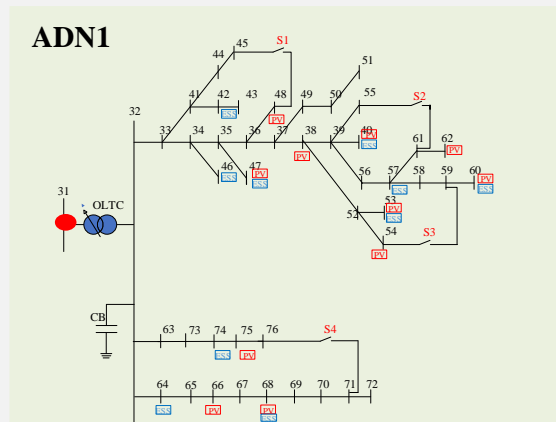


1 Topology of the TN and ADNs

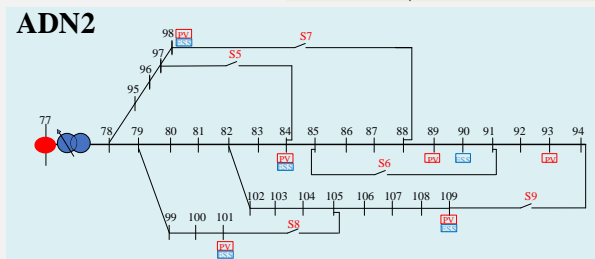


- The connect point of TN
- 31 ADN1 connects to TN
- 77 ADN2 connects to TN
- 110 ADN3 connects to TN

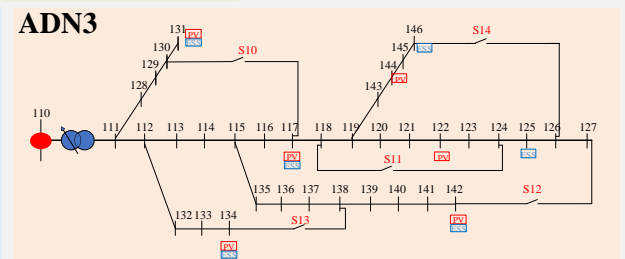
ADN1



ADN2



ADN3



2 TN Constraints

Second-Order Cone Relaxation Constraints

$$\left\{ \begin{array}{l} \left\| \begin{bmatrix} 2P_{ij} & 2Q_{ij} & v_i - l_{ij} \end{bmatrix}^T \right\|_2 \leq v_i + l_{ij} \\ \sum_{i \in \pi(j)} (P_{ij} - R_{ij} l_{ij}) - P_j = \sum_{l \in \sigma(j)} P_{jl} \\ \sum_{i \in \pi(j)} (Q_{ij} - X_{ij} l_{ij}) - Q_j = \sum_{l \in \sigma(j)} Q_{jl} \\ v_j = v_i - 2(R_{ij} P_{ij} + X_{ij} Q_{ij}) + (R_{ij}^2 + X_{ij}^2) l_{ij} \end{array} \right.$$

Voltage Constraint:

$$v_i^{\min} \leq v_i \leq v_i^{\max}$$

Line Capacity Constraint:

$$P_{ij}^2 + Q_{ij}^2 \leq S_{ij}^2$$