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Abstract
This thesis discusses the impact of dispersed generation systems (DGS) on fault current, protective coordination and voltage sags of distribution systems . One radial and one closed-loop distribution feeders of TPC are selected for computer simulation. Applying the DGS with synchronous and induction generators at different locations of the feeder to find the discrepancy in the fault currents by executing the short circuit analysis. To meet the TPC requirement, the fault current will be constrained by reducing the installation capacity of DGS or increasing the impedance of step-up transformers. The influence of the DGS on the protective relays and the coordination of the radial and closed-loop feeders are discussed in detail. To know the influence of voltage sags on the sensitivity load, the ride-through curves have been applied. The voltage sags will be solved to examine the corresponding location with the defined ride-through curves with or without the installation of DGS. Also, the frequency of sags occurrence per year can be predicted accurately. It is found that the maximum fault current may be produced when the DGS with synchronous generators are installed at the outlet of the feeder. The critical installation capacity of DGS and the minimum impedance of the step-up transformer can be derived easily and verified by the computer simulation. When the fault occurred at the outlet of the feeder, it will result in the largest voltage drop with less fault duration time. However, the fault duration time will be the same of the faults are occurred at the main trunk of closed-loop feeder. For the feeders served by the same or different distribution transformer, the voltage sags can be improved slightly by installing the DGS. It is concluded that the study can provide the good operating strategies for the DGS planners. The utilities can also improve the power quality and the reliability of the distribution systems by installation of DGS .
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