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Abstract
This thesis presents the Light Rail Transit（LRT）impact on the power quality of distribution feeders. To investigate the dynamic responses of the system voltage and current, the distribution system and LRT models are set up well by using the Alternative Transients Program. The power quality analysis of the distribution system will be executed under various operation scenarios. For the LRT with AC power sources, the single-phase transformer and Le Blanc transformer are both adopted in this paper. From the LRT with DC power sources, the 6 and 12 pulse rectifiers are considered. For the simulation results, it is found that the significant harmonic pollution, three-phase unbalance and neutral current are produced if the LRT is driven by the single-phase transformer. Furthermore, the problems of the three-phase unbalance and neutral current can be solved well if the power of LRT is supported by the Le Blanc transformer. However, the harmonic distortion of the distribution system is still serious due to the single-phase rectifier installed in the vehicle. On the other hand, the three-phase unbalance and neutral current are very small and can be ignored for the LRT with DC power sources. Although the serious harmonic distortion may be introduced by the 6 pulse rectifier installed at the Traction Supply Substation（TSS）, it can be further reduced and improved by the installation of suitable design filters or increasing the pulse number of rectifier. Besides the economic consideration, it is also important to know the power quality impact of masses transport systems with various power supply methods on the original power systems. The results of this thesis should be very helpful for the utility and the planners of masses transport systems.
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