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Analysis of Unbalance Effects on a Primary Feeder due to the Winding Connection of Distribution Transformers

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Abstract

The main purpose of this paper is to discuss the unbalance effects on a primary feeder due to the various connections of distribution transformers. First of all, the common distribution transformers, such as three-phase three-wire and three-phase four-wire grounded wye-delta (Yg), ungrounded wye-delta (Y), delta-delta (), open wye-open delta (UV) and open delta-open delta (V V) connection types were modeled in Matlab/Simulink, and then the connected load with balanced and unbalanced conditions were also assumed to do simulation and analysis. Besides, the voltage and current unbalance factors were applied to be the evaluation indices to assess the degree of unbalance. The outcomes are helpful to realize the unbalance effects due to the structure and winding connection of distribution transformers, and to provide important information for the distribution engineers to select the distribution transformers at the early planning stage.

Key words: Primary feeder;Distribution transformer;
Winding connection;Unbalance factor;Matlab/Simulink