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電壓、電流不平衡率定義之探討與分析

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摘要

本論文的主要目的在探討電壓、電流不平衡率的定義。本研究首先蒐集目前國際上較常用的電壓、電流不平衡率定義，歸納整理出三種較具代表性，且已被普遍採用之電壓及電流不平衡率定義，並列舉數國之相關標準與規範加以比較與分析。接著探討各種不平衡率定義與電壓、電流之大小與相角以及線路損失之相對關係，藉以評估各種電壓、電流不平衡率定義之優、缺點及適用性。最後以一範例系統分析與比較三種不平衡率定義之差異，以佐證前述評估之結果。研究所得的結果有助於對各種電壓、電流不平衡率定義之正確認知，對日後研訂不平衡率相關標準與規範亦有助益。

關鍵字：不平衡率；不平衡因數；線路損失；配電變壓器；

電力電容器組

Evaluation of the Definitions of Voltage and Current Unbalance Factors

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Abstract

The major purpose of this thesis is to examine the definitions of voltage unbalance factor. After carefully reviewing the related standards, research reports, journals and others, two types of definitions of voltage unbalance factor were found, one based on the magnitudes of phase voltages and the other on the symmetrical components of the phase voltage, and three common used definitions were detected. The relationship between these three definitions was explored in general and then the comparison between them was made according to their capability of evaluating the impact of the voltage unbalance, such as increment of system loss, interference of communication systems, malfunction of protective relays, etc. The advantages and disadvantages of these definitions can therefore be assessed based on the comparison results. Some unbalance cases were used to demonstrate the difference of them. The difference should be properly emphasized. The misuse of the definitions may lead to incorrect conclusions and increase significantly the investment cost of electric power engineering.

Key words: Unbalance ratio;Unbalance factor;Line loss;
Distribution transformer;Power capacitor bank