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Statistical Tools for SFRA Diagnosis in Power Transformers

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Abstract : For the interpretation of the signatures of sweep frequency response analysis(SFRA) of transformer different types of statistical techniques serves as an effective tool for doing either phase to phase comparison or sister unit comparison. In this paper with the discussion on SFRA several statistics techniques like cross correlation coefficient (CCF), root square error (RSQ), comparative standard deviation (CSD), Absolute difference, mean square error(MSE),Min-Max ratio(MM) are presented through several case studies. These methods require sample data size and spot frequencies of SFRA signatures that are being compared. The techniques used are based on power signal processing tools that can simplify result and limits can be created for the severity of the fault occurring in the transformer due to several short circuit forces or due to ageing. The advantages of using statistics techniques for analyzing of SFRA result are being indicated through several case studies and hence the results are obtained which determines the state of the transformer.

Keywords : absolute difference (DABS), cross correlation coefficient (CCF), mean square error (MSE), min-max ratio (MM-ratio), root square error (RSQ), standard deviation (CSD), sweep frequency response analysis (SFRA)
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