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Application of Two Stages Adaptive Neuro-Fuzzy Inference System to Improve Dissolved Gas Analysis Interpretation Techniques

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Abstract : Dissolved Gas Analysis is one of impressive technique to detect and predict internal fault of transformers by using gas generated by transformer oil sample. A number of methods are used to interpret the dissolved gas from transformer oil sample: Doernenberg Ratio Method, IEC (International Electrotechnical Commission) Ratio Method, and Duval Triangle Method. While the assessment of dissolved gas within transformer oil samples has been standardized over the past two decades, analysis of the results is not always straight forward as it depends on personnel expertise more than mathematical formulas. To get over this limitation, this paper is aimed at improving the interpretation of Doernenberg Ratio Method, IEC Ratio Method, and Duval Triangle Method using Two Stages Adaptive Neuro-Fuzzy Inference System (ANFIS). Dissolved gas analysis data from 520 faulty transformers was analyzed to establish the proposed ANFIS model. Results show that the developed ANFIS model is accurate and can standardize the dissolved gas interpretation process with accuracy higher than 90%.

Keywords : ANFIS, dissolved gas analysis, Doernenberg ratio method, Duval triangular method, IEC ratio method, transformer
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