

A Novel Approach of Power Transformer Diagnostic Using 3D FEM Parametrical Model

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Abstract : This paper deals with a novel approach of power transformers diagnostics. This approach identifies the exact location and the range of a fault in the transformer and helps to reduce operation costs related to handling of the faulty transformer, its disassembly and repair. The advantage of the approach is a possibility to simulate healthy transformer and also all faults, which can occur in transformer during its operation without its disassembling, which is very expensive in practice. The approach is based on creating frequency dependent impedance of the transformer by sweep frequency response analysis measurements and by 3D FE parametrical modeling of the fault in the transformer. The parameters of the 3D FE model are the position and the range of the axial short circuit. Then, by comparing the frequency dependent impedances of the parametrical models with the measured ones, the location and the range of the fault is identified. The approach was tested on a real transformer and showed high coincidence between the real fault and the simulated one.

Keywords : transformer, parametrical model of transformer, fault, sweep frequency response analysis, finite element method

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