**ZIG-ZAG GROUNDING TRANSFORMER MODELING FOR ZERO-SEQUNCE IMPEDANCE CALCULATION USING FINITE ELEMENT METHOD**

**Kassim Rasheed Hameed**

Lecturer, Electrical Engineering Department, Al-Mustansiriya University

(Received: 19/6/2014; Accepted: 22/10/2014)

**ABSTRACT: -** The grounding transformer is one of most important equipment in power energy system. This paper describes the modeling of zig-zag grounding transformer wound core type with varying degrees of complexity. In this paper, the Finite Element model (FEM) of zig-zag grounding transformer with non-linear magnetic characteristic for iron core is built using ANSYS software electromagnetic package. A numerical method, based on Finite Element Analysis (FEA), is presented for computing the zero-sequence impedance of grounding transformer. The analysis method is based on the two dimensions (2D) model and this model was solved by using the magnetic vector potential formulation (A).The main purpose of this paper is performing the modeling of the three-phase zig-zag grounding "wound core" transformer in 2D FEM for any capacity of transformer (100KVA- 1000KVA) and the Finite Element techniques are used for the magnetic field analysis to evaluate the magnetic field and to determine their distribution at any region inside the core window and winding.

Two types of analyses were performed, including static and transient analysis. The transient analysis in this work is simulated by direct coupling the 2D transformer model with external circuit (voltage sources) .The simulation results prove the analysis' correctness and validity, and the result of zero-sequence impedance of grounding transformer is verified by comparison with experimental result. Those measured in the Diyala transformer factory once the grounding transformer has been built. A good agreement of the computational results with experimental result by using this FEM model of zig-zag grounding transformer allowing us to know the transformer behavior before manufacturing them and, thus reducing the design time and cost.

**Keywords:** Finite Element Modeling; Grounding Transformer.