ANALYSIS OF THERMAL-ELECTRICAL MODELLING OF A DISTRIBUTION TRANSFORMER USING ANSYS AND CODE_SATURNE

Luciano Garelli[a], Gustavo Ríos Rodriguez[a], Paweł Lasek[b], Krzysztof Kubiczek[c], Mariusz Stępień[b] and Mario A. Storti[a]

[a]*Centro de Investigación de Métodos Computacionales, (CIMEC), (CONICET-UNL)
Colectora Ruta 168 s/n, Predio Conicet "Dr. Alberto Cassano", 3000 Santa Fe, Argentina,*
http://www.cimec.org.ar

[b]*Department of Power Electronics, Electrical Drives and Robotics, Faculty of Electrical Engineering,
Silesian University of Technology, Gliwice, Poland*

[c]*Department of Measurement Science, Electronics and Control, Faculty of Electrical Engineering,
Silesian University of Technology, Gliwice, Poland*

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Abstract. An efficient modelling of thermal-electrical problems, like in distribution transformers, requires complex multiphysics numerical analysis. The analysis can be done using one dedicated tool (software) with coupled multiphysics modelling, including the determination of power losses, heat generation, temperature conduction and convection and the fluid dynamics. Another possibility is to use two different tools, each one of them dedicated to solve the specific physics. In the following paper the electromagnetic simulation is taking place in Ansys EM solver and for CFD modeling Code_Saturne is used. The electromagnetic fields are calculated using transient simulation where the average power losses of the transformer are transferred after reaching quasi-steady state in order to reduce computation time. A coupled thermal-electrical numerical analysis for a distribution transformer is carried out using two separate tools with a interface created for this purpose. The thermal and electrical characteristics are analyzed and discussed in the paper.