

## Study of Strong Electromagnetic-thermal Coupling Behavior in Induction Motor

REGAZ Amar<sup>1</sup>, ELBAR Mohamed<sup>2\*</sup> and DOURARI Ahmed Lamine<sup>3</sup>

<sup>1</sup> Materials Science and Informatics Laboratory, MSIL, Ziane Achour University of Djelfa, Djelfa, Algeria.

<sup>2</sup> Faculty of Science and Technology, Applied Automation and Industrial Diagnostic Laboratory, University of Djelfa, Djelfa, Algeria.

<sup>3</sup> ICEPS Laboratory, Department of Electrical Engineering, Djillali Liabes University Sidi Bel Abbes, Algeria

\*(m.elbar@univ-djelfa.dz) Email of the corresponding author,

**Abstract** – In this paper after recalling the electromagnetic and thermal formulations in time harmonic of a three-phase asynchronous motor, we propose to study its electromagnetic-thermal behavior in the event that the motor is healthy and in the event that there is a fault. Therefore, it is quite natural to focus on the intervention of the coupling of the two physical phenomena in question. We used the direct coupling model (strong coupling), especially take into account the variation of physical properties (electric conductivity) in respect of temperature also the heat source in respect of electric filed and electric conductivity using the finite element method.

**Keywords** – Electromagnetic, Asynchronous Motor, Physical Phenomena, Electric Conductivity, Electric Conductivity.