Analysis of the Behavior in a Squirrel Cage Motor Under Electrical Internal Fault

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Abstract

The continuous and intensive use of squirrel-cage induction motors in the modern industry, has in some cases caused a serious deterioration of the electrical insulation in the windings of the machine, generating as a consequence internal short-circuit failures, the effects on the operation of the machine are difficult to determine experimentally.
In this article is presented a 2D model, time dependent on an induction motor 1.1kW, which implements a coupling of the interfaces of rotating machines, electrical circuits and global DAEs of COMSOL Multiphysics to determine the behavior of current, voltage, distribution of magnetic flux , magnetic field density, torque and speed in the transition from normal operation to operation under internal short-circuit failure of adjacent phase coils.
The model has three different levels of short-circuit severity, performing a comparative analysis with the model in normal operation, the latter validated with experimental results.