

Study and analysis the effect of variable applied voltage on SCIM performances based on FEA

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Abstract:

Study and analysis the effect of variable applied voltage on SCIM performances based on FEA is presented. Three phase squirrel cage induction motor SCIM has been investigated and numerically simulated using finite element method (FEM) with the aid of ANSYS software (RMxpvt and Maxwell 2D/3D). This research presents study and analysis of the effects of the voltage variation on performance and efficiency of the three-phase induction motor of the squirrel cage type. The Finite Elements Analysis Method FEA is used as one of the best methods for analysis and simulation of electrical motors in addition to the possibility of dealing with nonlinear equations, Since the induction motor is a complex electromagnetic reaction, the researchers used the ANSYS program to represent and analyze the performance of the motor under variable supply voltage. The case studied in this research is three phases, 380V, 50Hz, 2.2kW, induction motor that widely use in industrial application. The aim of this research is to study the effect of voltage variation on efficiency, current value, power factor and torque of SCIM. The RMxpvt software has been used for modeling and simulating the induction motor and calculating the values of phases currents, input and output power in additional of overall efficiency at steady state condition. The next stage of the research is creating Maxwell 2-D design from the base model of RMxpvt software, Maxwell 2-D model has the ability to computing the distribution of magnetic field and explaining the performance under steady-state operation. The obtained results show significant reduction of motor performance due to the effect of variation of apply voltage..