Modelling Approach of an Asynchronous Motor Using Bessel Functions

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Abstract

The presented paper belongs to the field of theoretical electrical engineering with applications in electromagnetism and electrical machines. The asynchronous motor, which is based on the principle of induction, exhibits an electromagnetic interaction between the revolving stator field and the field induced in the rotors squirrel cage bars that varies depending on the angular slip frequency. Based on this interaction, the Bessel function known from high-frequency engineering is derived, explaining the speed-torque characteristics of the induction motor. For validation, experimental induction motors were set up in the laboratory, subjected to measurement and calculation, whose results were compared.