Mathematical Model of a Three-Phase Induction Motor with Asymmetrical Twelve-Zone Stator Windings

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***Abstract*—The paper proposes a mathematical model of a three-phase induction motor with an asymmetrical twelve-zone winding of stator with parallel connection of subwindings. The mathematical model was developed using the theory of generalized electromechanical converter and contains equations of electrical equilibrium of six stator windings and three rotor windings. The equations for calculating the electromagnetic moment and the equations of motion of the induction motor with an asymmetrical twelve-zone stator winding rotor were obtained. The developed mathematical model in the form of cell-matrix equations has been implemented in MATLAB/Simulink.**

Keywords—induction motor, asymmetrical twelve-zone winding, generalized electromechanical converter, mathematical modelling.

I. Introduction

It is known that induction motors (IM) and electric drives based on them are one of the most significant consumers of electrical energy in the structure of world energy consumption. This is due to the wide scope of these engines in modern industrial production. The known standard IEC 60034 [1] obliges manufacturers to search for new ways to minimixe losses in electrical machines.

In world practice, there are two main directions for solving this problem. The first direction is the transition to a controlled electric drive based on semiconductor frequency converters (FC) [2– 6], that makes it possible to supply the end user with the power required at a particular moment [7].

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