SUMMARY

The dissertation consists of an introduction, 6 sections, conclusions, a list of sources used with 52 names and 16 appendices. The full volume of the dissertation is 248 pages and 29 figures.

The purpose of the work is to increase of dynamic performance and energy efficiency of control in EMS with vector-controlled electric motors due to development of the generalized nonlinear control methods with freely formed indicators of control performance.

The paper analyzes the existing methods of control of a class of nonlinear objects with electromechanical energy conversion that are subject to the transformation of Blondel-Park, and determines that currently there are no generalized methods of control of all electric machines of this class or they are very complex. As an alternative, a generalized method of synthesis of vector control based on field-oriented transformation of coordinates with decomposition of electromechanical system into electromechanical-electromagnetic subsystems and mechanical-electric subsystems is proposed. To illustrate and prove the asymptotic stability and solution of control processes in these subsystems, a synthesis of control algorithms for the mechanical coordinates of the following motors was performed: DC motor with independent excitation, interior permanent magnets synchronous motor, induction motor with short-circuit rotor.

FIELD-ORIENTED COORDINATE CONVERSION, ELECTRICAL MACHINE, VECTOR CONTROL, SYSTEM OF DIFFERENTIAL EQUATIONS, FLUX COUPLING