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MATRIX STRUCTURE OF UNIFIED MATHEMATICAL MODEL OF ELECTRIC AC MACHINES AT CONTROL

The matrix structure of the equations of a generalized electric alternating current machine is proposed, which, based on the Parke equations, is written in the coordinate axes of the machines rotating with the rotor speed. In the matrix structure, the column matrices of the derivatives of the stator, excitation and rotor windings are equal to the product of diagonal matrices consisting of the machine parameters and the column matrices of the flux links themselves and the sum of the matrix columns of the control parameters which are the matrix columns of the stator voltage, excitation voltage, androtorvoltage.
It is shown that the matrix structure of a generalized controlled AC machine is transformed into mathematical models of almost all encountered AC electric machines, namely, into a synchronous machine with two excitation windings - a longitudinal and a transverse one; in a synchronous machine with a longitudinal field winding (classic); in an asynchronous machine with a squirrel-cage rotor; into an asynchronous machine with a phase rotor.Ithasbeenshown that the matrix structure includes the controls of these machines both from the stator and from the rotor. On the stator side for synchronous machines, it is a frequency control that regulates both the amplitude and frequency of the applied voltage, and on the rotor side, a constant voltage control is supplied to the longitudinalandtransversewindings.
For asynchronous machines, the stator and rotor are frequency-controlled. The following are examples of frequency control of an asynchronous machine both from the stator andfromtherotor
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Основные авторы: Prof. MUSTAFAYEV, Rauf (Azerbaijan Scientific-Research & Designed-Prospecting Institute of Energetics); Prof. YUSIFBAYLI, Nurali (Azerbaijan State Oil and Industry University); HASANOVA, Laman (Azerbaijan Scientific-Research & Designed-Prospecting Institute of Energetics)

Докладчик: Prof. YUSIFBAYLI, Nurali (Azerbaijan State Oil and Industry University)

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