studied. The measurement results discussed in this paper are obtained on a four-pole 130 kVA synchronous machine.

Keywords: Parameter estimation, synchronous machines.

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Discussion Deadline: September 2002

Improved Field Oriented Control of a LIM Having Joints in Its Secondary Conductors

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Abstract: This paper presents a primary-flux-control algorithm suitable for applications in short-primary long-secondary linear induction motor drive systems. The advantage of the proposed control algorithm is that is more robust than the conventional vector control algorithm to the variation of the secondary resistance caused by the effect of joint in the secondary conductors, which can be made of several pieces of aluminum plates or rails joined together. The algorithm was tested by simulation on a sample of linear motor disk drive system. The simulation results were compared to those obtained by a conventional vector control algorithm. Simulations and experiments have shown that the fluctuations of the thrust and attraction forces obtained with the proposed primary-flux control algorithm were significantly less than those obtained with the conventional vector control algorithm.

Keywords: Linear induction motor, joint effect, field orientation, primary flux control, vector control, simulation, LIM model.

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Simulation of Switched Reluctance Motor Drives Using Two-Dimensional Bicubic Spline

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Abstract: In this paper, a novel simulation algorithm of switched reluctance motor drives is presented. With the proposed algorithm the two-dimensional bicubic spline interpolation is used to describe the nonlinear magnetic characteristics in switched reluctance motors. The corresponding computational method of two-dimensional bicubic spline function is described in detail. The simulation results are also compared with and validated by experimental data. Compared with conventional techniques, the presented simulation algorithm is more accurate even though it requires relatively little information on the magnetic characteristics of the motor.

Keywords: Simulation, bicubic spline, switched reluctance motor drives.

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Discussion Deadline: September 2002

Magnetic Saturation Effects on the Control of a Synchronous Reluctance Machine

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Abstract: Experimental results on the magnetic saturation effects on the control of a small synchronous reluctance machine (600 W) are presented in this paper. A new model of the machine, including saturation effects and cross magnetization, is first developed. An approach based on total and mutual inductances is followed instead of the traditional approach via magnetizing and leakage inductances. All the electrical and mechanical parameters measurement required for the simulations are given. A rotor-oriented vector control of the synchronous reluctance machine is achieved with a DSP board (TMS32OC3I) and experimental results are presented. When the magnetic circuit is saturated, the simulation with the developed model shows a good accuracy of the results when they are compared to the experimental ones.

Keywords: Synchronous reluctance machine, saturation, vector control.

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Derating of Induction Motors Operating With a Combination of Unblanced Voltages and Over- or Under-voltages

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Abstract: This paper examines the proper application of induction machines when supplied by unbalanced voltages in the presence of over- and undervoltages. Differences in the definition of voltage unbalance are also examined. The approach adopted is to use NEMA derating for unbalanced voltages as a basis to include the effects of undervoltages and overvoltages through motor loss calculations.

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A Complete Lumped Equivalent Circuit of Three-Phase Squirrel-Cage Induction Motors Using the Two-Dimensional Finite Elements Technique

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Abstract: This paper presents the use of the finite element technique for determining the parameters of a three-phase squirrel-cage induction motor. The common parameters, in addition to the core losses and ratio of number of turns, are obtained from the finite element field solutions. The magnetizing characteristic and core losses curve are used to determine the flux distribution within the motor structure. The linear time harmonic vector potential field solution is utilized for the inductances computation. The accuracy of the finite element application is verified using the available precise results.

Keywords: Finite elements method, induction motor, equivalent circuit.

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Discussion Deadline: September 2002

Induction Generator Controller Based on the Instantaneous Reactive Power Theory

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Abstract: A novel control strategy for a stand-alone induction generator (IG), working with variable speed and load, is proposed. The IG is simultaneously excited by a capacitor and an inverter. The capacitor provides the rated reactive current needed to excite the IG while the inverter adds the reactive current needed to regulate the IG output voltage. The control strategy is based on the instantaneous reactive power theory. A 4 kW laboratory prototype has been built to validate the proposal and experimental results are presented.

Keywords: ac generator excitation, induction generator, instantaneous reactive power theory.

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Online Cage Rotor Fault Detection Using Air-Gap Torque Spectra

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Abstract: This paper discusses use of air-gap torque spectra as a means of identifying faults in cage rotors. Being dependent on both stator and rotor currents, the torque is very sensitive to faults in the ro-