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A Comparative Analysis Between Field-oriented Control and Uncontrolled Current Operation of a Brushless DC Motor Field-oriented Control for Induction Motor Drives Projet d'une Compagnie pour l'Amérique The Field Orientation Principle in Control of Induction Motors Design and field oriented control of synchronous reluctance motors SENSORLESS DIRECT FIELD ORIENTED CONTROL OF INDUCTION MACHINE BY FLUX AND SPEED ESTIMATION USING MODEL REFERENCE ADAPTIVE SYSTEM. Robust Shaping Indirect Field Oriented Control for Induction Motor An Induction Motor Saturation Model for Improved Field Oriented Control Vector Control and Dynamics of AC Drives Field Oriented Control of Induction Motors Introduction to ac drives & field-oriented control. CD-ROMs Indirect Field Oriented Control of an Induction Motor Implemented with an Artificial Neural Network Field Oriented Control of Induction Motor Speed [microform] A New Observer for Speed Sensorless Field Oriented Control of an Induction Motor Field Oriented Control of Step Motors Adaptive Field Oriented Control of Induction Motors Investigation of an Indirect Field Oriented Control Structure for an Induction Motor Servodrive Nonlinear Field Oriented Control of Induction Motors Using the Backstepping Design A Digital Implementation of Feedforward Field-oriented Control Rotor Resistance Identification in the Field Oriented Control of a Squirrel Cage Induction Motor Robust Field Oriented Control of Induction Motor Field oriented control Field Oriented Control of a Single Inverter, Dual, Parallel Induction Machine Traction Drive for Electric Vehicles Digital Simulation of Field-oriented Control of Induction Motor Drives Microprocessor-Based Field-Oriented Control of a Synchronous Motor Drive Using a Three-Phase Solid-State Sinusoidal Current Source Enhanced Rotor Field Oriented Control of Five-phase Induction Motor with the Combined Fundamental and Third Harmonic Currents Load-adaptive Smooth Startup Method for Sensorless Field-oriented Control of Permanent Magnet Synchronous Motors Speed Sensorless Field Oriented Control of an Induction Motor at Zero Speed with Identification of Inverter Parameters Speed Tracking of Indirect Field Oriented Control Induction Motor Using Neural Network Indirect Rotor Field Oriented Control of Induction Motor with Rotor Time Constant Estimation Investigation and Analysis of Field Oriented Control System of an Induction Machine Field Oriented Control of Induction Motor Fed from an AC Resonant Link Converter Indirect Field Oriented Control of an Induction Motor Implemented with an Artificial Neural Network Field Oriented Control of Multiple Induction Machines Connected in Parallel Vector Control of Three-Phase AC Machines Field Oriented Control of Ipmsm Optimal Efficiency Field Oriented Control of an Induction Machine Simulation of Indirect Rotor Flux Field-oriented Control of Induction Motor Drive Speed sensorless field oriented control of an induction motor at zero speed with identification of inverter parameters Self-commissioning for Sensorless Field Oriented Control of PM Motors

Field Oriented Control of Induction Motor Speed [microform] Feb 10 2022
Field Oriented Control of Ipmsm Feb 16 2020 Field Oriented Control of IPMSM with Variable Direct and Quadrature Axis Inductance presents different novel speed control techniques for the field-oriented control of ac motors, particularly interior permanent magnet synchronous motor (IPMSM). Theoretical basis of each algorithm is explained in detail and then performance of each is tested by simulations. The complete drive system with PI and fuzzy based controllers have been simulated with Matlab Simulink. Here, a robust controller and a fuzzy logic controller (FLC) have been designed and incorporated in simulation model of the drive system. Fuzzy controllers have the ability to handle nonlinear system uncertainties, such as, step change in command speed, load compact, saturation and parameter variations. The results of PI controller based IPMSM drive have been compared with those obtained from FLC based ac motor drives. Simulation results proof the efficacy of the fuzzy controller based IPMSM drive over the PI controller.
SENSORLESS DIRECT FIELD ORIENTED CONTROL OF INDUCTION MACHINE BY FLUX AND SPEED ESTIMATION USING MODEL REFERENCE ADAPTIVE SYSTEM. Sep 17 2022 ABSTRACT SENSORLESS DIRECT FIELD ORIENTED CONTROL OF INDUCTION MACHINE BY FLUX AND SPEED ESTIMATORS USING MODEL REFERENCE ADAPTIVE SYSTEM This work focuses on an observer design which will estimate flux-linkage and speed for induction motors in its entire speed control range. The theoretical base of the algorithm is explained in detail and its both open-loop, and closed-loop performance is tested with experiments, measuring only stator current and voltage. Theoretically, the field-oriented control for the induction motor drive can be mainly categorized into two types.
Speed Tracking of Indirect Field Oriented Control Induction Motor Using Neural Network Sep 24 2020
An Induction Motor Saturation Model for Improved Field Oriented Control Jul 15 2022
The Field Orientation Principle in Control of Induction Motors Nov 19 2022 The Field Orientation Principle was fIrst formulated by Haase, in 1968, and Blaschke, in 1970. At that time, their ideas seemed impractical because of the insufficient means of implementation. However, in the early eighties, technological advances in static power converters and microprocessor-based control systems made the high-performance a. c. drive systems fully feasible. Since then, hundreds of papers dealing with various aspects of the Field Orientation Principle have appeared every year in the technical literature, and numerous commercial high-performance a. c. drives based on this principle have been developed. The term "vector

control" is often used with regard to these systems. Today, it seems certain that almost all d. c. industrial drives will be ousted in the foreseeable future, to be, in major part, superseded by a. c. drive systems with vector controlled induction motors. This transition has already been taking place in industries of developed countries. Vector controlled a. c. drives have been proven capable of even better dynamic performance than d. c. drive systems, because of higher allowable speeds and shorter time constants of a. c. motors. It should be mentioned that the Field Orientation Principle can be used in control not only of induction (asynchronous) motors, but of all kinds of synchronous motors as well. Vector controlled drive systems with the so called brushless d. c. motors have found many applications in high performance drive systems, such as machine tools and industrial robots.

Field-oriented Control for Induction Motor Drives Jan 21 2023

Investigation of an Indirect Field Oriented Control Structure for an Induction Motor Servodrive Oct 06 2021 Field oriented control of ac drives was introduced more than twenty years ago. It now has a high degree of maturity and has become increasingly popular in many applications. There are two general classes of field oriented control scheme, namely direct and indirect. In direct field orientation, the position of the flux to which orientation is desired is directly measured using sense coils or estimated from terminal conditions. The indirect scheme provides an alternative to direct sensing of flux position, and employs the slip relation to estimate the flux position relative to the rotor. Both basic types of field orientation have some sensitivity to machine parameters and provide non-ideal torque control characteristics when control parameters differ from actual machine parameters. In general, both steady state torque control and dynamic torque response differ from the ideal instantaneous torque control achieved by a correctly tuned controller. This thesis presents an investigation of parameter sensitivity in a high performance inverter fed induction motor servodrive system employing indirect field oriented control. The development of a fully digitally controlled drive is described. Analytic expressions are derived to evaluate the servodrive performance in both torque and velocity models of operation. A systematic derivation is performed to relate the rotor flux linkage and electromagnetic torque to the nominal machine parameters instrumented in the indirect vector controller and to the actual values of the machine parameters. In indirect control, the major problem is the rotor open-circuit time constant, which is sensitive to both temperature and flux level. When this control parameter is incorrect, the calculated slip frequency is incorrect and the flux angle is no longer appropriate for field orientation. Hence, for correct operation an accurate knowledge of the relevant machine parameters is required and the precise measurement of the parameters of the prototype machine is presented. A detailed simulation model of the servodrive system is also formulated. There is an excellent correlation between the model and the measured results from the practical drive system, proving the validity of the motor characterisation tests and the presence of a properly tuned controller.

Indirect Field Oriented Control of an Induction Motor Implemented with an Artificial Neural Network May 21 2020

A Digital Implementation of Feedforward Field-oriented Control Aug 04 2021

Design and field oriented control of synchronous reluctance motors Oct 18 2022

Projet d'une Compagnie pour l'Amérique Dec 20 2022

Robust Field Oriented Control of Induction Motor Jun 02 2021

Field Oriented Control of Induction Motors May 13 2022

Microprocessor-Based Field-Oriented Control of a Synchronous Motor Drive Using a Three-Phase Solid-State Sinusoidal Current Source Jan 29 2021

Simulation of Indirect Rotor Flux Field-oriented Control of Induction Motor Drive Dec 16 2019

Speed Sensorless Field Oriented Control of an Induction Motor at Zero Speed with Identification of Inverter Parameters Oct 26 2020

Field Oriented Control of Multiple Induction Machines Connected in Parallel Apr 19 2020

Nonlinear Field Oriented Control of Induction Motors Using the Backstepping Design Sep 05 2021

Indirect Rotor Field Oriented Control of Induction Motor with Rotor Time Constant Estimation Aug 24 2020

Digital Simulation of Field-oriented Control of Induction Motor Drives Feb 27 2021

Optimal Efficiency Field Oriented Control of an Induction Machine Jan 17 2020

Load-adaptive Smooth Startup Method for Sensorless Field-oriented Control of Permanent Magnet Synchronous Motors Nov 26 2020 A field oriented control (FOC) system and method provides smooth field-oriented startup for three-phase sensorless permanent magnet synchronous motors (PMSMs) despite the absence of load information. The system uses the rotor flux projection on the d- or q-axis to determine whether the stator flux current reference being applied during reference startup phase is sufficient to spin the PMSM, thereby providing smooth operation during the reference startup phase and saving energy relative to applying rated current. The system also determines a suitable initial value for the stator torque current reference to use at the start of closed-loop sensorless FOC control mode based on an angle difference between the reference and estimated angles. Since this angle difference is reflective of the load on the PMSM, the selected initial value allows the system to achieve a smooth transition from reference startup mode to closed-loop sensorless FOC control mode.

Vector Control of Three-Phase AC Machines Mar 19 2020 The book deals with the problem area of the vector control of the three-phase AC machines like that one of the induction motor with squirrel-cage rotor (IMSR), the permanentmagnet excited synchronous motor (PMSM) and that one of the doubly fed induction machine (DFIM) from the view of the practical development. It is primarily about the use of the IMSR as well as the PMSM in the electrical drive systems, at which the method of the field-oriented control has been successful in the practice, and about the use of the grid voltage oriented controlled DFIM in the wind power plants. After a summary of the basic structure of a field-oriented controlled three-phase AC drive, the main points of the design and of the application are explained. The detailed description of the design rules

forms the main emphasis of the book. The description is expanded and made understandable by numerous formulae, pictures and diagrams. Using the basic equations, first the continuous and then the discrete machine models of the IMSR as well as of the PMSM are derived. The vectorial two-dimensional current controllers, which are designed with help of the discrete models, are treated in detail in connection with other essential problems like system boundary condition and control variable limitation. Several alternative controller configurations are introduced. The voltage vector modulation, the field orientation and the coordinate transformations are treated also from the view of the practical handling. The problems like the parameter identification, parameter adaptation and the management of machine states, which are normally regarded as abstract, are so represented that the book reader does not receive only attempts but also comprehensible solutions for his system. The practical style in the description of the design rules of the drive systems are also continued consistently for the wind power systems using the DFIM. The represented control concept is proven practically and can be regarded as pioneering for new developments. The introduced control structures of the three machine types have led to a relatively mature stage of development in the practice. Some disadvantages have nevertheless remained at these linear control concepts, which have to be cleared only with nonlinear controllers. Going out from the structural nonlinearity of the machines, the suitable nonlinear models are derived. After that, nonlinear controllers are designed on the basis of the method of the "exact linearization" which proves to be the most suitable in comparison with other methods like "backstepping-based or passivity-based designs".

Self-commissioning for Sensorless Field Oriented Control of PM Motors Oct 14 2019

Field Oriented Control of a Single Inverter, Dual, Parallel Induction Machine Traction Drive for Electric Vehicles Mar 31 2021

Robust Shaping Indirect Field Oriented Control for Induction Motor Aug 16 2022 In this paper, we have studied the robustness of H control applied to an induction motor and by using the Luenberger observer for the observation of rotor flux. The obtained results showed the robustness of the variables flux and speed against external disturbances and uncertainties of modelling. This method enabled us to ensure a good robustness/stability compromise as well as satisfactory performances. The use of the Luenberger observer enables us to avoid the use of the direct methods of measurements weakening the mechanical engineering of the system.

Vector Control and Dynamics of AC Drives Jun 14 2022 This book presents a detailed but easily understood development of the complex variable form of the equations describing AC machines. These equations are then extended to incorporate inverter models and a number of examples of inverter-machine dynamics are presented. A section on constantspeed behaviour includes development of the conventional equivalent circuits and an extensive treatment of the constant speed eigenvalues and switching transients.Vector control and field orientation concepts are first introduced in terms of their steady state properties. This allows anyone with a basic understanding of steady state machine behaviour to understand and appreciate the potential of field orientation and to actually start using the bookimmediately. This is followed by a full dynamic analysis of vector controlled systems including conventional indirect and direct field orientation and less conventional systems that orient to air gap or stator flux rather than rotor flux. A chapter on the important types of current regulators isalso included.The final two chapters deal with vector control and field orientation system performance in relation to tuning errors, saturation effects, selection of flux levels to optimize performance and the question of optimization in the field weakening mode.

Field Oriented Control of Step Motors Dec 08 2021

Speed sensorless field oriented control of an induction motor at zero speed with identification of inverter parameters Nov 14 2019

Adaptive Field Oriented Control of Induction Motors Nov 07 2021

Field Oriented Control of Induction Motor Fed from an AC Resonant Link Converter Jun 21 2020

Enhanced Rotor Field Oriented Control of Five-phase Induction Motor with the Combined Fundamental and Third Harmonic Currents Dec 28 2020

Introduction to ac drives & field-oriented control. CD-ROMs Apr 12 2022 " ... comprised of excerpts from the Power Electronics and Motor Drives video series. In this tutorial, the presenters provide an overview of power electronic circuits, which includes rectifiers and inverters. Both current source and voltage source inverters are discussed as well as different pulse width modulation techniques"--Container.

Field oriented control May 01 2021

Indirect Field Oriented Control of an Induction Motor Implemented with an Artificial Neural Network Mar 11 2022

Rotor Resistance Identification in the Field Oriented Control of a Squirrel Cage Induction Motor Jul 03 2021

A Comparative Analysis Between Field-oriented Control and Uncontrolled Current Operation of a Brushless DC Motor Feb 22 2023 Field-oriented control (FOC), also known as vector control is a very popular and effective way of driving a Brushless DC (BLDC) motor. However, the BLDC motor can also be run without any current controlling. In this thesis, this method is addressed as uncontrolled current operation, which is simply driving a BLDC motor in the absence of vector control. The characteristics and conditions for effective operation of the uncontrolled current are studied. The thesis discusses and models both vector control and uncontrolled current operation and describes a Simulink simulation building procedure for these two methods. An overall comparison is carried out between these two methods for various aspects, such as commutation accuracy, maximum torque production, handling of external delays, etc. In the analysis, it is seen that the vector control shows a better operating range, but the uncontrolled current shows better stability. The simulation shows that vector control cannot handle external hindrance (such as the computing delay of the controller) very well. On the other hand,

the uncontrolled current can handle external delay better. This makes the uncontrolled current method suitable to be used in a microcontroller, as microcontrollers can be slow. Whereas, the vector control will require a very fast computer. As a potential application, the system with the uncontrolled current method is then simulated as laboratory equipment for an introductory control theory course. The model and simulation generated data shows a good match, which indicates uncontrolled current method can be used to build a low-cost introductory control theory laboratory equipment.

Investigation and Analysis of Field Oriented Control System of an Induction Machine Jul 23 2020

A New Observer for Speed Sensorless Field Oriented Control of an Induction Motor Jan 09 2022