

Xin Jing

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General Motors

Status: F-1 Visa holder

Nationality: Chinese

Work Status: OPT

BACKGROUND AND EXPERIENCE

Have experiences in electric machines and adjustable-speed drives, power electronics and their corresponding loss analysis, modeling of electric motor, different control strategies for motor drives, modeling and control of wind turbine-generator systems.

EDUCATION

- 2010-2012: **Marquette University**, Milwaukee, WI
 M.Sc. in Electrical and Computer Engineering **Current GPA: 3.91/4**
 Major: Electric Machines and Drives, Power Electronics
 Thesis: Modeling and Control of a Doubly Fed Induction Generator (DFIG) for Wind Turbine-Generator Systems (WTGS)
 Course work included: Advanced Design Machine and Drives, Modern Control Theory, Protection and Monitoring of Electric Energy Systems, Advanced Topics in Electrical and Computer Engineering (Wind energy systems), Advanced Electric Machines and Drives, Power Electronics for Renewable Energy Systems, Design and Analysis of Electric Motor-Drive Systems
 Advisor: Prof. Nabeel A. O. Demerdash
- 2008-2010: **Harbin Institute of Technology**, Harbin, Heilongjiang, China
 M.Sc. in Control Engineering **GPA: 75/100**
 Major: Control Science and Engineering
 Thesis: Particle Swarm Optimization and Its Application in Rendezvous and Docking of Spacecraft
 Course work included: Linear System, Optimal Control, Stability Theory, Optimal Navigation and Filter
 Advisor: Shenmin Song
- 2004-2008: **Shijiazhuang Railway University**, Shijiazhuang, Hebei, China
 B.SC in Electrical and Computer Engineering **GPA: 85/100**
 Major: Power Electronics, Electric Machines and Drives and Automatic Control
 Course work included: Motion control, Electrical Machines for Control, Power Electronic technology, Fundamentals for Electrical drives and Electrical Machinery

CURRENT WORK

 **Jan 2013 - Now** **Motor Control Engineer,** General Motors Advanced Technology Center, Torrance, CA

- ❖ **Motor Control Engineer:** Design and update control strategies for electrical motors that used in electrical or hybrid vehicles. These control strategies include different PI controller design for motor

current control, field weakening algorithm for IM and PM, advanced torque estimation methods, advanced PWM switching technologies, dead time compensation methods due to the PWM algorithm and so on. Optimize algorithm design through modeling, simulation, data collection, and analysis and validate new algorithm through working with software and calibration engineers for dyne testing. Generate the engineering documents and technical reports for the control algorithms.

INDUSTRIAL EXPERIENCE

● **Jun 2012-Sep 2012** **Electrical Engineering Co-op,** Regal Beloit, Department of Product Development, Wausau, WI

- ❖ **Motor Software Design Co-op:** Involve in an in-depth study of 3-phase electric machine theory followed by application of concepts in real world machine performance. Design and update of program code to accurately model 3-phase electrical induction motors, which include the saturation effects, skin effects, and core loss calculations and so on.

ACADEMIC EXPERIENCE

● **Sep 2012- Dec 2012** **Research Assistant,** Electric Machines and Drives Laboratory, Marquette University, Milwaukee, WI

- ❖ **Application and Losses Analysis of ANPC Converters in Doubly-Fed Induction Generator Wind Energy Conversion System:**

Different PWM switching strategies are studied for a three-level ANPC converter and the switching and conduction losses of ANPC Converters in doubly-fed induction generator wind energy conversion system are analyzed, in which a double switching frequency PWM is applied.

● **Sep. 2010- Present** **Teaching assistant,** Marquette University, Department of Electrical and Computer Engineering

- ❖ Electric Circuits II, sophomore level course
- ❖ Electric Circuits & Machinery, junior level course
- ❖ Electromagnetic Fields I, junior level course
- ❖ Design and Analysis of Electric Motor-Drive, senior level course
- ❖ Electric Drives (Electromechanical Energy Conversion), junior level course

● **Sep. 2010- Present** **Research assistant,** Electric Machines and Drives Laboratory, Marquette University, Milwaukee, WI

Modeling of wind turbine-generator system: Develop the aerodynamic modeling, drive train system modeling, DFIG modeling and power converter modeling of the wind turbine-generator system; Deduce the simplified models of drive train system and reduced-order model of Doubly Fed Induction Generator (DFIG). Comparisons of these simplified and full order modes are implemented by Matlab/Simulink.

Control of wind turbine-generator system: Design and develop the control strategies for the wind turbine-generator system which include the grid-side converter control (**indirect current control**), rotor-side converter control using the stator flux oriented control and stator voltage oriented control (**vector control of DFIG**), maximum power point tracking (**current-mode control**) and pitch control. The simulation of the wind turbine-generator system was finished by using Matlab/Simulink.

Power Electronics: Design and implement **DC-DC buck, boost, buck-boost converters**, single phase and three phase full bridge **AC/DC converters** (rectifier), single phase and three phase full bridge **DC/AC converters** (inverter), **two level back-to-back converter, three level NPC inverter and cascaded inverter**. Apply **six step modulation, SPWM, space vector PWM** in above converters. Simulations are accomplished by Simulink and Matlab/Simulink.

Electric Machines: Develop the model of a **permanent magnet brushless dc motor** both in ABC frame and DQO frame, and simulate the start transient of this motor which was fed by a six step inverter; Simulate a **turbogenerator (cylindrical-rotor synchronous machine)** in both ABC and DQO reference, in which case the damper windings are considered; Simulate a **permanent magnet synchronous generator** based wind turbine-generator system, in which case, the generator is connected by a three phase AC/DC converter, a DC-DC buck-boost converter and a three phase PWM inverter; Develop the models of a **wound rotor induction motor** in ABC and DQO reference, which the models are expressed in rotor, stationary stator, and synchronously rotating DQO reference frames (**Make class notes for Advanced Design of Machine and Drives**).

Other Experience: Operate a permanent magnet synchronous motor by using Yaskawa Drive V1000. Open-circuit, no-load and full load tests are carried out on the motor-drive system. The data acquisition and reports about the experiment results are finished.

● **Oct. 2009—July. 2010** **Research assistant**, Harbin Institute of Technology

Application of Particle Swarm Optimization (PSO) in Optimal Orbit Design: Manage the whole project, which included the improvement of basic PSO, the deduction of Lambert theorem and the expression of objective function.

● **Sep. 2008—Sep. 2009** **Research assistant**, Harbin Institute of Technology

Monocular Vision-based Measurement Method for Rendezvous and Docking Simulation System: Accomplish image matching technique, CCD calibration, posture measurement, image processing, and controller design.

CONFERENCE PUBLICATIONS

- 1) **Xin Jing**, Jianbiao He and Nabeel A. O. Demerdash, "Application and Losses Analysis of ANPC Converters in Doubly-Fed Induction Generator Wind Energy Conversion System ", *IEEE International Machines and Drives Conference, Chicago, accepted, 2013*.
- 2) **Xin Jing**, Shenmin Song, "The Application of Cooperative Particle Swarm Optimization with Quadratic Interpolation in Optimal Lambert Two-impulse Transfers", *2010 International Conference on Artificial Intelligence*, pp. 153-159, 2010, Las Vegas, USA.
- 3) **Xin Jing**, Xiujie Zhang and Shenmin Song. "Chaotic Cooperative Particle Swarm Optimization Based on Tent Map", *International Conference on Information Engineering and Computer Science*, 2009, pp.1-4.

SKILLS

Software Skills: Proficiency in C, Matlab, Simulink, LabView, Fortran, Assembling Language and Protel.

Hardware Skills: Familiar with Single-Chip Microcomputer 8051, PLC and DSP-TMS320F2812

Language: English and Chinese