CURRICULUM VITAE

PING HSU

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EDUCATION:

University of California, Berkeley; Dept. of EECS.
Ph.D. in Electrical Eng., graduated: 12/88
Thesis title: Control of Mechanical Manipulators
Minor areas: Mechanics and Mathematics

Southern Methodist University, Dallas, Texas
M.S. in Electrical Eng., graduated: 12/79
Major area: Computer Hardware and Digital System
Minor area: Computer software.

St. John's Unversity, Taiwan (formerly, St. John's & St. Mary's Institute of Technology)
Major area: Electronics
Diploma, graduated: 6/77

EXPERIENCE:

8/13-present San Jose State University
College of Engineering
Position: Interim Associate Dean

8/12-2/13 San Jose State University
College of Engineering
Position: Interim Dean

8/08 – 8/12 San Jose State University
Department of Electrical Engineering
Position: Professor

10/01 – 8/08 San Jose State University
College of Engineering
Position: Associate Dean

8/00 – 9/01 San Jose State University
Department of Electrical Engineering
Position: Associate Chair

8/90-7/00 San Jose State University
Department of Electrical Engineering
College of Engineering
Position: Assistant Professor ('90), Associate Professor ('93), and Professor ('00)

1/89-7/90 University of Illinois at Urbana-Champaign
Department of Mechanical and Industrial Engineering

Position: Assistant Professor

8/83-12/88 University of California, Berkeley
Position: Research Assistant
Research areas include general system theory, adaptive control, robotics, and dynamics.
Position: Teaching Assistant
Taught one semester control lab and four semesters instrumentation lab.

1/80-7/83 The Navtrol Company, Dallas, Texas. (214)234-3319
Position: Engineer
Developed various real time digital control system components and supervised the prototype construction.

1/79-1/80 Southern Methodist University, Dallas, Texas.
Position: Research Assistant
Worked in Solar Energy Research Lab. Designed and installed interface for controlling a X-Y positioner with a HP 9825 microcomputer.

7/79-9/79 TOCOM Cooperation, Dallas, Texas.
Position: Summer intern
Designed a local data scanner system based on a Z80 CPU to back up a minicomputer system for the central office of a cable TV based home security system.

8/78-12/78 Southern Methodist University, Dallas, Texas.
Position: Research Assistant
Designed and installed an interface system connecting a magnetic tape recorder with an EAI 640 minicomputer.

INDUSTRY PROJECTS:

Kenetech Windpower

- Developed a real-time rotor resistance identification scheme for a Field Oriented Controlled (FOC) induction generator. The objective of the study was to evaluate the potential performance improvement provided by such an identification scheme.

- Studied the dynamic interaction between a FOC based controller with the dynamics of the generator, the gear box, and the main turbine shaft. An analytic model and a computer model of the overall system were developed. The purpose of the study was to identify potential excessive stress on the gears due to the dynamic interaction between the control algorithm and the structure dynamics of the gear box and the turbine shaft.

- Studied the transient torque produced by an induction generator during an electrical failure due to phase-to-phase or phase-to-neutral cable short or inverter component failure.

- Developed a control algorithm for inverters for unbalanced loading condition. The control scheme adaptively adjust both the positive and negative sequence components of the output current so as to keep the voltage balanced under unbalanced loading condition.

- Studied and proposed a way to detect speed measurement error (tachometer failure) by power measurement.

- Studied the relationship between the flux level and the overall power loss (including the inverter and the generator loss).

Exponent Failure Analysis

- The work involved studying failure modes of various electronics and electrical equipment.

Trace Technologies:

- Studied a high efficient grid-tied photovoltaic inverter system and proposed an optimum peak-power-tracking algorithm.

- Developed a 3-level PWM control scheme for a grid-tied inverter. This scheme substantially reduced the switching loss and the transformer core loss. This resulted in a substantial improvement of the overall system efficiency.

- Developed a control scheme including necessary analog circuitries for data acquisition for a micro-turbine driven DC brushless generator. The speed of operation of this system can reach up to 100krpm.

- Developed a Field Oriented Control (FOC) program for a wind turbine driven, grid-tied, doubly fed wound-rotor 750kW generator. This wind turbine is currently a major production model by a major energy/electic equipment company in the US. The control program is based on a DSP digital control system and it is capable of controlling both the real and the reactive output power. This work included the development of the control program, a computer model, an analytic model, and the evaluation and field testing of the system.

GE Nuclear

- Developed an experimental FOC based induction motor driven positioning system. The system is for the control of nuclear reaction control rods. The experimental system has the potential of replacing the existing stepper-motor based system. This work include the development of a fully functional system and the design and development of a custom induction motor.

- Evaluation of the stability of a voltage regulator for a variable speed induction motor. This motor is used in a recalculation system in nuclear reactors.

United Defenses

- Involvoed in the development of a field-oriented control based induction motor/generator control system for special purpose diesel-electric vehicles.

- Developed computer models for permanent magnet machines and induction machine and their control systems for the next generation diesel-electric vehicles.

BAE Systems

- Providing advices and guidelines for power electronics and their control for various special purpose hybrid vehicles..

PUBLICATION:

[1] "Adaptive Control of Mechanical Manipulators"; John J. Craig, Ping Hsu, and S. Shankar Sastry, *International Journal of Robotics Research.* Vol. 6, #2, Summer 1987. pp. 3-15. Also in *Proceedings of the 1986 IEEE International Conference on Robotics and Automation. San Francisco*. pp. 190-195.

[2] "Adaptive Identification and Control for Manipulators without Using Joint Accelerations", P. Hsu, M. Bodson, S. Sastry, and B. Paden, *Proceedings of the* 1987 *IEEE International Conference on Robotics and Automation*. Raleigh, North Carolina. pp.1210-1215.

[3] "The Effect of Discretized feedback in a Closed Loop System", Ping Hsu, and Shankar Sastry, *Proceedings of the 26th IEEE Conference on Decision and Control*, Los Angles. Dec. 1987. pp. 1518-1523.

[4] "Dynamic Control of Redundant Manipulators", Ping Hsu, John Hauser, and Shankar Sastry. *Proceedings of the* 1988 *IEEE International Conference on Robotics and Automation*, Philadelphia. pp.183-187. Also in the Journal of Robotics Systems April 1989. pp. 133-148.

[5] "Grasping and Manipulation of an Object by a Multifingered Robot Hand", Ping Hsu, Zexiang Li, and Shankar Sastry, *Proceedings of the 1988 IEEE International Conference on Robotics and Automation*, Philadelphia. pp.384-389. Also in the *International Journal of Robotics Research*. July 1989.

[6] "Dynamic Coordination of a Multiple Robotic System", Zexiang Li, Ping Hsu, and Shankar Sastry. *Proceedings of the 1988 American Control Conferenc*e, Atlanta, Georgia. June 1988.

[7] "Control of Multi-Manipulator Systems - Trajectory Tracking, Load Distribution, Internal Force Control, and Decentralized Architecture", Ping Hsu. *Proceedings of the 1989 IEEE International Conference on Robotics and Automation*. Phoenix, Arizona. May 1989. pp.1234-1239.

[8] "Dynamic Regrasping by Coordinated Control of Sliding for a Multifingered Hand", Arlene Cole, Ping Hsu, and Shankar Sastry. *Proceedings of the 1989 IEEE International Conference on Robotics and Automation.* Phoenix, Arizona. May 1989. pp.781-786.

[9] "Control of Mechanical Manipulators near Singular Configurations", Ping Hsu and Yaoxin Qian. 1989 NASA Ames-U.C. Berkeley, Workshop on Nonlinear Systems and Flight Control. Aug. 1989.

[10] "Exact Linearization with Configuration Optimization", Ping Hsu. *Proceedings of the 1990 American Control Conferenc*e, San Diego, California, May 23-25. pp.1192-1197.

[11] "The Wedge -- A Controller Design Experiment", Ping Hsu, Richard Bohn, William Cahoon, Tony Marketti, Christopher Runge, David Soderstrom, Dana Ward, and Jeffrey Wendlandt. *Proceedings of the 1991 IFAC Conference on Advances in Control Education*. Boston, MA., June 24-25, 1991. pp.169-174.

[12] "On the Stability of Second-Order Multidimensional Linear Time-Varying Systems", Ping Hsu and Jinnwen Wu. AIAA Journal of Guidance, Control, and Dynamics, Vol. 14, No. 5, September 1991. pp.1040-1045.

[13] "Exact-Linearization and Stabilization of a Nonlinear System", Ping Hsu and Irma Alarcon, ASME Winter Annual Meeting, paper No. 91-WA-DSC-11, Atlanta, GA., December 1-6, 1991.

[14] "Coordinated Control of Multiple Manipulator Systems", Ping Hsu and Steven Su, *Proceedings of the 1992 IEEE International Conference on Robotics and Automation*. Nice, France, May 10-15. 1992. pp.2199-2204.

[15] "Dynamic Control of Sliding by Robot Hands for Regrasping," A. Cole, P. Hsu, and S. Sastry, *IEEE Transactions on Robotics and Automation*, Vol. 8, No. 1. February, 1992, pp.42-51.

[16] "Dynamics and Control Design Project Offers Taste of Real World," Ping Hsu, *IEEE Control Systems Magazine*, Vol. 12, No. 3, June 1992. pp.31-38.

[17] "Dexterous End-Effectors and Grasping". Part 9 in *Robot Control: Dynamics, Motion Planning and Analysis*. Edited by Spong, Lewis, and Abdallah. IEEE Press. 1992, pp.361-365.

[18] "Adaptive Coordination of a Mulit-manipulator Sytem", Ping Hsu. *Proceedings of the 1993 IEEE International Conference on Robotics and Automation*, Atlanta, pp.259~263.

[19] "Adaptive Resolution of Conflicts in Multi-manipulator Systems", Ping Hsu. *Proceedings of the 1993 American Control Conference*, San Francisco, California, pp341-345..

[20] "Coordinated Control of Multiple Manipulator Systems", Ping Hsu, *IEEE Transactions on Robotics and Automation*, 1993, Vol. 9, No. 4, August, pp.400~410..

[21] "Adaptive Internal Force Control of a Two-Manipulator System", Ping Hsu. *ASME Press Series on Robotics and Manufacturing: Recent Trends in Research, Education, and Applications*. Volume 5, , pp. 151~155. 1994.

[22] "Modeling and Control of Induction Motors with Magnetic Saturation in Field Coordinates", P. Hsu & B. Erdman, *Proceedings of the 25th Annual IEEE Power Electronics Specialists Conference*, , pp.1103~1107, 1994.

[23] "An Application Oriented Intorductory-level Automatic Control Course", P. Hsu & J. Gabel, *American Society for Engineering Education 1995 Annual Conference Proceedings*, , pp.721~727, 1995.

[24] "Power Recovery Property of Electrical Active Suspension Systems" P. Hsu *Proceedings of The 31st. Intersociety Energy Conversion Engineering Conference*. pp. 1899~1904, 1996.

[25] "Evaluation of Vector Controlled Induction Motors as Joint Actuators for Industrial Robots", P. Hsu and J. Laud *Proceedings of the Fourth IASTED International Conference on Robotics and Manufacturing*. , pp.308~311, 1996.

[26] “Torque Ripple Compesation of Induction Motors Under Field Oriented Control”, R. Barro and P. Hsu. *Proceedings of the 12th Annual Applifed Power Electronics Conference*. , pp.527~533, 1997.

[27] “Predictive Discrete Time Control Of Switch-mode Applications”, Doug Sprock and P. Hsu. *Proceedings of the 28th Annual IEEE Power Electronics Specialists Conference*, June 1997.

[28] “Torque Ripple Compensation of Vector Controlled Induction Machines R. Barro and P. Hsu. *Proceedings of the 28th Annual IEEE Power Electronics Specialists Conference,.,* June 1997.

[29] “A Three-Phase synchronous Frame Controller for Unbalanced Load”, P. Hsu and M. Behnke. *Proceedings of the 29th Annual IEEE Power Electronics Specialists Conference,.,* May 1998.

[30] “A Model Based Delta Modulation AC Inverter”. D. Sprock and P. Hsu, *Proceedings of the Second IASTED International Conference on Control and Applications*. July 1999. pp. 183-187.

[31] P. Hsu "Stability Analysis of AC Steady-State Control for Inverters", 2000 IEEE International Conference on Control Applications. Sept. 2000.

[32] P.Hsu "Steady State Control of a Four-Wire AC Inverter.", *Proceedings of the 2001 IASTED International Conference on Control Application.* Banff, Canada.

[33] P.Hsu “Performance Improvement for a DSP Based Control Induction Motors and Generators.” for United Defense LLP. SJSU Foundation 2413052841. January 2003.

[34] P. Hsu “Hybrid Electric Propulsion System Modeling and Control.” Final report for United Defense LLP. January 2004. SJSU Foundation #24-1305-3242.

[35] “How Important is the WOW Factor in First Year Engineering Courses?” ASEE Annual conference, 2013, T. Anagnos, B. Furman, P. Hsu, P. Backer, June 2013.

[36] “Optimal Aerodynamic Energy Capture Strategies for Hydrostatic Transmission Wind Turbine' D. Rajabhandharaks and P. Hsu; 2014 2nd IEEE Conference on Technologies for Sustainability. July, 2014.