

Curriculum Vitae

Liang-liang Yang, Ph.D., Associate Prof.

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Self-Assessment and Personal Data

- Stable personality and high sense of responsibility.
- Highly-motivated and reliable person with excellent health and pleasant personality.
- Well-founded academic knowledge base and all-around development.
- Work well with a multi-cultural.
- Be highly organized and efficient.
- **Birth-date: Feb., 1978, Married**

Current Research Interests

- Motion control system design with high speed and high precision.
- System identification related to mechatronics, especially motion control system.
- Control algorithms of multi axes synchronization motion.
- Disturbance compensation and residual vibration suppression in motion control system.
- Trajectory plan of motion control, including point to point movement and spline curve interpolation.
- Robotics control system design, including trajectory plan applied to robotics movement and motion control algorithms applied to robotics motion control.

Education

2005-2009 Ph. D.

School of Mechanical Science & Engineering, Huazhong University of Science & Technology, China

Majored in Mechatronic Engineering

Thesis: Research on Ultra-Precision Motion Controller Structure for Step & Scan Projection Lithography

Supervisors: Professor, Yunfei Zhou

2002-2005 M.S.

School of Mechanical Science & Engineering, Huazhong University of Science & Technology, China

Majored in Mechatronic Engineering

Thesis: Design on Image Process Subsystem of Intelligent Cash Sorter

Supervisors: Professor, Yunfei Zhou

1997-2001 B.S.

Department of Vehicle Engineering, Chongqing University of Technology, Chongqing, China

Scholarships and Awards

- University Scholarship, once per year during 1997 ~ 2001
- Guanghua Scholarship during 2003 ~ 2004
- Outstanding graduate student cadres during 2006 ~ 2008
- Outstanding graduate student, 2009
- Excellent worker of College of Mechanical Engineering & Automation, Zhejiang Sci-Tech University, 2010 ~ 2014
- Outstanding scientific and technical worker of Zhejiang Sci-Tech University, 2013

Research Activities

Jan.2011~ now Zhejiang Sci-Tech University

Control algorithms related to motion control and robot control based on self-made DSP board

- Research on the inverse and forward kinematics of stacking robot, SCARA type robot and 6 axes universal serial robot, especially realization of inverse and forward kinematics algorithm in real mechatronics control system of DSP.
- Research on the negative influence of time-delay on motion control system composed of a linear permanent motor and the approaches to design a time-delay compensation controller to improve motion tracking performance.
- Research on the identification algorithms of motion control system.
- Research on the point to point trajectory plan and spline curve interpolation.
- Research on the disturbance compensation algorithms of high speed motion system with iterative learning.
- Research on residual vibration suppression of motion system with resonance mode.
- All above research results are already realized or will realize in self-made motion control board and according software.

July.2009~ Dec. 2010 Zhejiang Sci-Tech University

Motion control system design based on DSP, Design Motion control board and monitor software running in the host computer.

- Set up the motion control experimental platform with linear permanent synchronous motor, self-made board and software.
- Design motion control and monitor software running in host computer, communication with motion control board by RS232,485 or USB
- Design motion control board using DSP of TMS320F28335, the self-made motion control board could control 4-6 axes;

Sep.2007 ~ June. 2009 Huazhong University of Science and Technology

Research on motion control of 65nm step & scan projection lithography machine with dual stages

- Design hardware structure of control system of 65nm step & scan projection lithography machine with dual stages, including motion control board, sensor board, synchronous bus control board, multi processors running and synchronous mechanism of lithography machine.
- Design closed-loop control algorithms applied in motion platform with high speed and high precision.

Sep.2003 ~ Aug. 2007 Huazhong University of Science and Technology

Research on motion control of 100nm step & scan projection lithography machine

- Design hardware structure of control system of 100nm step & scan projection lithography machine, including motion control board, sensor board, synchronous bus control board and synchronous mechanism of lithography machine.
- Design software framework of motion control board, especially control software.
- Design trajectory plan of point to point with S type curve.

Sep.2002 ~ Aug. 2003 Huazhong University of Science and Technology

- Design control system and image process algorithms of cash sorter

Sponsored Research

- Research on repeated disturbance identification of linear servo system with high frequency response based on iterative learning (2013~2016) , Supported by The National Natural Science Foundation ,China
- The demonstrator project of the first CNC generation creatively applied in mechanical product of Zhejiang province. (2013~2015), Supported by The national ministry of science and technology ,China
- Research on suppression of residual vibration of high speed motion system (2012~2013), Supported by the Zhejiang Sci-Tech University, China.
- Research on key technology and industrialization of multi-layer leather cutting machine (2010~2012), Supported by the Zhejiang Science and Technology Agency, China.

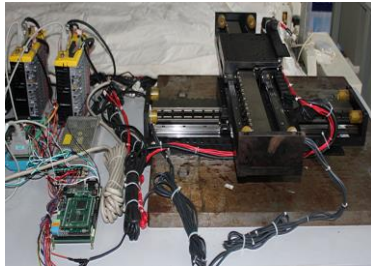
Publications(Recent five years)

- **Liangliang Yang**, Xiaohu Wu, Weimin Shi, Laihu Peng. Research on Model parameters identification of closed-loop high frequency motion control system based on iterative learning of orthogonal projection[J]. Journal of Mechanical Engineering, vol.51, no.1, pp.188-195, 2015.
- **Liangliang Yang**, Weimin Shi, Yisheng Liu, Yunfei Zhou. Identification and optimization of linear servo system controller parameters based on iterative learning of orthogonal projection[J],Chinese Mechanical Engineering, vol.26, no.1, p 79-84, 2015.
- **Liangliang Yang**, Weimin Shi, Yisheng Liu, Yunfei Zhou. Research on algorithm of S_shape acceleration and deceleration time based on newton iterative method[J],Chinese Mechanical Engineering, vol.26, no.7, p 912-916, 2015.
- **Liangliang Yang**, Weimin Shi, Laihu Peng, Research on residual vibration suppression of trajectory glue based on adaptive pulse reshape filter[J], Manufacturing Automation, vol.34, no.5, pp. 4-8, 2012.
- **Liangliang Yang**, Weimin Shi, Laihu Peng, Research on parameter identification and compensation of force ripple in linear drive system based on iterative learning[J], Micromotors, vol.44, no.6, pp. 74-76, 2011.

Patents

- **Liangliang Yang**, Hongwei Ge, Weimin Shi, et al. Stacking robot with 5 freedom, Patent No. ZL201510040397.1
- **Liangliang Yang**, Weimin Shi, Dechao Zhang. Mechatronics identification method for position closed loop motion control system, Patent No. ZL201310231057.8
- **Liangliang Yang**, Xiaodong Gu, Xin Xu. A device for automatically adding and squeezing cream,

Research platform



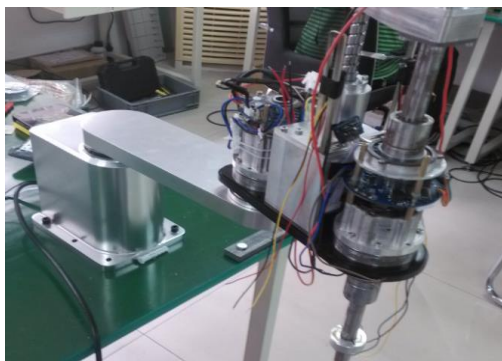
Linear servo motion platform



Stacking robot



6 axes serial robot



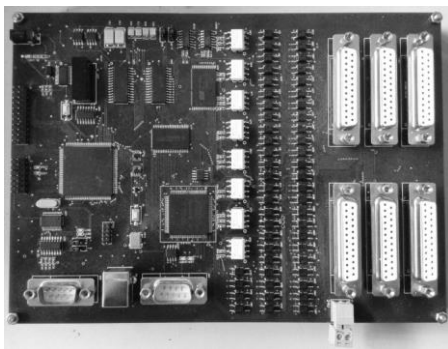
SCARA robot



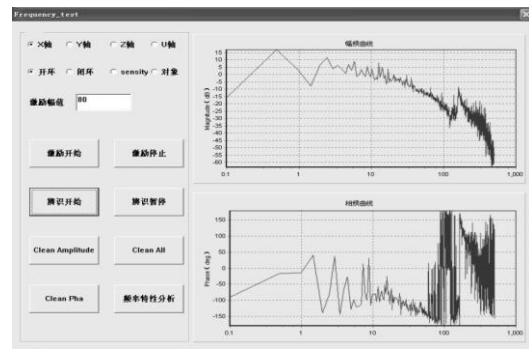
Motion platform with resonance mode

Motion control board and host monitor software

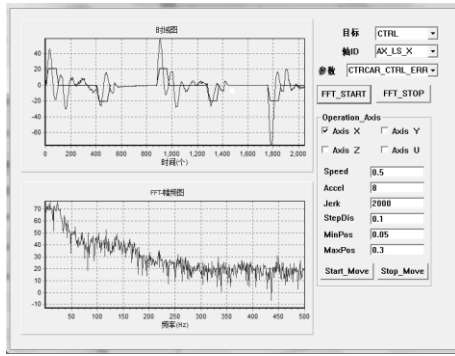
- With features of signal analysis, bode diagram plotting, motion performance test, data tracing and diagnosis.
- The motion algorithms in progress of research could easily added to motion system.



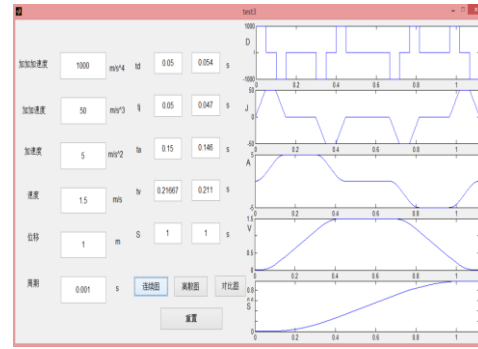
Self-made motion control board based on DSP



motion performance test software



Phenomenon of residual vibration



3 or 4 order trajectory plan of point to point