

Shuitao Yang

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Education:

- 2009.9-2010.7 PH. D. degree, major in Power Electronics and Electrical Drives
College of Electrical Engineering, Zhejiang University, China
Supervisor: Prof. Zhaoming Qian
- 2008.9-2009.9 Visiting scholar, major in Power Electronics and Electrical Drives
Dept. of Electrical and Computer Engineering, Michigan State University, USA
Supervisor: Prof. F. Z. Peng
(Supported by China Scholarship Council, CSC)
- 2004.9-2008.9 PH. D. candidate, major in Power Electronics and Electrical Drives
College of Electrical Engineering, Zhejiang University, China
Supervisor: Prof. Zhaoming Qian
- 2000.9-2004.7 Bachelor, major in Electronics and Information Engineering
College of Electrical Engineering, Zhejiang University, China

Working Experience:

- 2013.5-present Assistant Professor, Michigan State University
- Department: Electrical and Computer Engineering
 - Research topic: “Transformer-Less Unified Power Flow Controller For Wind And Solar Power Transmission,” supported by ARPA-E/US-DOE, from Jan. 27. 2012 to Jan. 26. 2015.
- 2012.4-2013.5 Lead Electrical Engineer, GE (China) Research and Development Center Co., Ltd.
- Business Segment: GE Power Conversion
 - Job Description: new product design of medium voltage (MV) variable frequency drives for general industrial applications, power rating from 1-6 MVA, voltage rating 6.6 kV with low cost, high performance and high power density.
 - Taking leading role for:
 - Product specifications analysis, concept comparison and design optimization;
 - Pulse width modulation (PWM) method design, implementation and verification

- for selected multi-level inverter;
- Unique xSim simulation for induction motor and synchronous motor control (xSim simulation is based on GE PECe system and PLECS software);
- Software evaluation platform (SEP) development and commissioning;
- electro-mechanical-thermal design and simulation for both power stack and motor drive line-up;
- Prototype test, trouble shooting and demonstration.

2010.7-2012.4

Electrical Engineer, GE (China) Research and Development Center Co., Ltd.

- Business Segment: GE Oil & Gas
- Job Description: developing IGCT based medium voltage (MV) high power drive product for Oil & Gas applications. Power rating from 10-30 MVA, output frequency up to 567Hz, motor voltage 3.3kv/ 6.6 kV.
- Main Contributions:
 - Developed a whole Software Evaluation Platform (SEP) for control and software test
 - Control software design and implement based on GE Mark VIe control platform, including active front end (AFE), Induction motor (IM) and permanent magnet (PM) motor control.
 - Passive component design and selection, such as inductor/transformer, capacitor, harmonic filters.
 - Nominated to take “Foundations of GE leadership” training and won the “egg drop competition”
 - Recognized by GE Oil & Gas due to the leadership in “External Pump-back Test”.

2004. 9-2010.7

Research experience during PH. D. study:

- Microgrid: grid-connected inverter current control, stand-alone inverter voltage control, distributed generation (DG) power flow control, intentional islanding operation control, microgrid system configuration and protection.
- Z-source inverter: Z-source inverter modulation and dc-link voltage control; application for ac speed regulation system and PV generation system; novel bi-directional current-fed Z-source/ quasi-Z-source inverter and their applications.
- Universal DSP control platform: development of DSP (TMS320LF2407) plus CPLD (XC95144XL) control board with fiber-optic interface.
- Emergency Power System: a bidirectional DC-DC converter plus a DC-AC inverter, hardware development and control algorithm design.
- Multi-level inverter: 50 kVA three-level neutral point clamped (NPC) inverter module design for MV drive; and research on zigzag inverter.

Main Publications:

- [1] Shuitao Yang, F. Z. Peng, Qin Lei, R. Inoshita, and Zhaoming Qian, "Current-fed quasi-Z-source inverter with voltage buck-boost and regeneration capability," *IEEE Transactions on Industry Applications*, vol. 47, no.2, pp. 882-892, Apr. 2011.
- [2] Qin Lei, F. Z. Peng, and Shuitao Yang, "Multi-loop control method for high-performance micro-grid inverter through load voltage and current decoupling with only output voltage feedback," *IEEE Transactions on Power Electronics*, vol.26, no.3, pp. 953-960, Mar. 2011.
- [3] Shuitao Yang, Qin Lei, F. Z. Peng, and Zhaoming Qian, "A robust control scheme for grid-connected voltage-source inverters," *IEEE Transactions on Industrial Electronics*, vol. 58, no.1, pp. 202-212, Jan. 2011.
- [4] I. J. Balaguer, Qin Lei, Shuitao Yang, U. Supatti, and F. Z. Peng, "Control for grid-connected and intentional islanding operations of distributed power generation," *IEEE Transactions on Industrial Electronics*, vol. 58, no.1, pp. 147-157, Jan. 2011.
- [5] Qin Lei, F. Z. Peng, and Shuitao Yang, "Discontinuous operation modes of current-fed Quasi-Z-source inverter," in *IEEE Applied Power Electronics Conference and Exposition (APEC)*, Fort Worth, TX, Mar. 6-11, 2011, pp. 437-441.
- [6] Qin Lei, F. Z. Peng, Liangzong He, Shuitao Yang, "Power loss analysis of current-fed quasi-Z-source inverter," in *IEEE Energy Conversion Congress and Exposition (ECCE)*, Atlanta, GA, Sept. 12-16, 2010, pp. 2883-2887.
- [7] Qin Lei, Shuitao Yang, and F. Z. Peng, "Multi-loop control algorithms for seamless transition of grid-connected inverter," in *IEEE Applied Power Electronics Conference and Exposition (APEC)*, Palm Spring, CA, Feb. 21-25, 2010, pp. 844-848.
- [8] Shuitao Yang, Qin Lei, F. Z. Peng, and Zhaoming Qian, "A robust control scheme for grid-connected voltage source inverters," in *IEEE Applied Power Electronics Conference and Exposition (APEC)*, Palm Spring, CA, Feb. 21-25, 2010, pp. 1002-1009.
- [9] Qin Lei, Shuitao Yang, and F. Z. Peng, "High-performance and cost-effective multiple feedback control strategy for standalone operation of grid-connected inverter," in *IEEE Applied Power Electronics Conference and Exposition (APEC)*, Palm Spring, CA, Feb. 21-25, 2010, pp. 854-860.
- [10] Qin Lei, Shuitao Yang, F. Z. Peng, and R. Inoshita, "Three phase current-fed Z-source PWM rectifier," in *IEEE Energy Conversion Congress and Exposition (ECCE)*, San Jose, CA, Sept. 20-24, 2009, pp. 1569-1574.
- [11] Shuitao Yang, F. Z. Peng, Qin Lei, R. Inoshita, and Zhaoming Qian, "Current-fed quasi-Z-source inverter with voltage buck-boost and regeneration capability," in *IEEE Energy Conversion Congress and Exposition (ECCE)*, San Jose, CA, Sept. 20-24, 2009, pp. 3676-3682.

- [12] Shuitao Yang, Qin Lei, F. Z. Peng, R. Inoshita, and Zhaoming Qian, "Current-fed quasi-Z-source inverter with coupled inductors," in IEEE Energy Conversion Congress and Exposition (ECCE), San Jose, CA, Sept. 20-24, 2009, pp. 3684-3689.
- [13] W. Du, X. Huang, Shuitao Yang, Fan Zhang, X. Wu, and Zhaoming Qian, "A novel equalization method with defective-battery-replacing for series-connected lithium battery strings," in IEEE Energy Conversion Congress and Exposition (ECCE), San Jose, CA, Sept. 20-24, 2009, pp. 1806-1811.
- [14] Qin Lei, Shuitao Yang, F. Z. Peng, and R. Inoshita, "Application of current-fed quasi-Z-source inverter for traction drive of hybrid electric vehicle," in IEEE Vehicle Power and Propulsion Conference (VPPC), Dearborn, MI, Sept. 7-11, 2009, pp. 754-760.
- [15] Qin Lei, Shuitao Yang, F. Z. Peng, and R. Inoshita, "Steady state and transient analysis of a three phase current-fed Z-source PWM rectifier," in IEEE Vehicle Power and Propulsion Conference (VPPC), Dearborn, MI, Sept. 7-11, 2009, pp. 426-432.
- [16] Shuitao Yang, X. Ding, Fan Zhang, F. Z. Peng, and Zhaoming Qian, "Unified control technique for Z-source inverter," in IEEE Power Electronics Specialists Conference (PECS), Rhodes, Greece, Jun. 15-19, 2008, pp. 3236-3242.
- [17] X. Ding, Zhaoming Qian, Shuitao Yang, B. Cui, and F. Z. Peng, "A direct dc-Link boost voltage PID-like fuzzy control strategy in Z-source inverter," in IEEE Power Electronics Specialists Conference (PECS), Rhodes, Greece, Jun. 15-19, 2008, pp. 405-411.
- [18] Fan Zhang, Shuitao Yang, F. Z. Peng and Zhaoming Qian, "A zigzag cascaded multilevel inverter topology with self voltage balancing," in IEEE Applied Power Electronics Conf. (APEC), Texas, USA, Feb. 24-28, 2008, pp. 1632-1635.
- [19] X. Ding, Zhaoming Qian, Shuitao Yang, and F. Z. Peng, "A new feedforward compensation to reject dc-link voltage ripple in bi-directional Z-source inverter ASD system," in IEEE Applied Power Electronics Conf. (APEC), Texas, USA, Feb. 24-28, 2008, pp. 1809-1813.
- [20] X. Ding, Zhaoming, Qian, Shuitao Yang, Bin Cui, and F. Z. Peng, "A new adjustable-speed drives (ASD) system based on high-performance Z-source inverter," IEEE Industry Applications Conf., New Orleans, LA, Sept. 23-27, 2007, pp. 2327-2332.
- [21] Shuitao Yang, Bin Cui, Fan Zhang, and Zhaoming Qian, "Robust repetitive control strategy for CVCF inverters with very low harmonic distortion," in IEEE Applied Power Electronics Conf. (APEC), Anaheim, CA, Feb. 25-Mar. 1, 2007, pp. 1673-1677.
- [22] X. Ding, Zhaoming, Qian, Shuitao Yang, Bin Cui, and F. Z. Peng, "A direct peak dc-link boost voltage control strategy in Z-source inverter," in IEEE Applied Power Electronics Conf. (APEC), Anaheim, CA, Feb. 25-Mar. 1, 2007, pp. 648-653.
- [23] X. Ding, Zhaoming, Qian, Shuitao Yang, Bin Cui, and F. Z. Peng, "A high-performance Z-source inverter operating with small inductor at wide-range load," in IEEE Applied Power Electronics Conf. (APEC),

Anaheim, CA, Feb. 25-Mar. 1, 2007, pp. 615- 620.

- [24] X. Ding, Zhaoming, Qian, Shuitao Yang, Bin Cui, and F. Z. Peng, "A PID control strategy for dc-link boost voltage in Z-source inverter," in IEEE Applied Power Electronics Conf. (APEC), Anaheim, CA, Feb. 25-Mar. 1, 2007, pp. 1145- 1148.
- [25] Shuitao Yang, X. Ding, J. Liu, and Zhaoming Qian, "Analysis and design of a cost-effective voltage feedback control strategy for EPS inverters," in IEEE Power Electronics Specialists Conf. (PECS), Orlando, FL, Jun. 17-21, 2007, pp. 477-482.
- [26] Shuitao Yang, Fan Zhang, Xinping Ding, and Zhaoming Qian, "Comprehensively research on the photovoltaic maximum power point tracking via Input parameters or output parameters," Transaction of China Electrotechnical society, vol. 24, no. 6, pp. 95-102, Jun. 2009. (in Chinese)
- [27] Shuitao Yang, Xinping Ding, Fan Zhang, and Zhaoming Qian, "A study on Z-source inverter for photovoltaic generation system," Proceedings of the Chinese Society for Electrical Engineering, vol. 28, no. 17, pp. 112-118, Jun. 2008. (in Chinese)
- [28] Shuitao Yang, Fan Zhang, and Zhaoming Qian, "DSP-based multiple-loop control strategy for UPS inverters with effective control delay elimination," Transaction of China Electrotechnical society, vol. 23, no. 12, pp. 84-91, Dec. 2008.
- [29] Shuitao Yang, Fan Zhang, Jinyun Liu, and Zhaoming Qian, "A novel voltage balance control strategy of half-bridge inverter," Transaction of China Electrotechnical society, Vol.21, no.7, pp. 31-36, Jul. 2006. (in Chinese)
- [30] Shuitao Yang, Fan Zhang, Huijie Zhao, and Zhaoming Qian, "Study of signals transmission in high power IGBT driver circuit," Power Electronics, vol. 40, no, 1, pp.117-119, Jan. 2006. (in Chinese)