Asst. Prof. Dr.-Ing. Sudchai Boonto

CONTACT INFORMATION

Department of Control System and Instrumentation Engineering
King Mongkut's University of Technology Thonburi
126 Prachautid Road,
Bangmod, Tungkru, 10140

Tel: +662 470 9094
Fax: +662 470 9100
E-mail: sudchai.boo@kmutt.ac.th
WWW: www.kmutt.ac.th

RESEARCH INTERESTS

Robust Control, Linear Parameter-Varying Control, Mechatronic Systems, Feedforward Robust Control, Robust Repetitive Control, System Identification, Convex Optimization Applications

EDUCATION

Hamburg University of Technology (TUHH)

Dr.-Ing. in Automatic Control Engineering 2011

The University of Manchester Institute of Science and Technology (UMIST) , Now is The University of Manchester, UK

M.Sc., Advanced Control, March 2000

King Mongkut's University of Technology Thonburi, Bangkok, Thailand

B.Eng., Electrical Engineering, May 1995

ACADEMIC EXPERIENCE

King Mongkut's University of Technology Thonburi (KMUTT), Bangkok Thailand

Head of the department **Nov 2015-present**

Assistant Professor **2013–present**

Lecturer **1995–2013**

Undergraduate

- INC 102 Instrumentation and Process Control
- INC 111 Basic Engineering Circuit Analysis
- INC 151 Circuit Analysis by Engineering's Software Practice
- INC 211 Mathematics for Signals and Systems
- INC 221 Electronics Devices and Circuit Design
- INC 231 Electrical Measurement
- INC 251 Digital and Electronics Laboratory I
- INC 341 Feedback Control System
- INC 341(n) System Modelling and Analysis
- INC 354 Process Instrumentation Laboratory
- INC 481 System Dynamics and Modelling

Graduate

- INC 521 System Identification
- INC 691 Linear and Nonlinear System Identification
- INC 692 Robust Control
- INC 693 System Dynamics and Modelling
- INC 694 Neural Network and Its Applications

- EEE 600 System Analysis Techniques

Hamburg University of Technology (TUHH), Hamburg Germany
Teaching Assistant **2003–2009**

- Neural and Genetic Computing for Control of Dynamic Systems

Research Activities

Since 2011

- "The Development of Autonomous Driving Technology", Fundamental Fund- Thailand Science Research aind Innovation - TSRI 10/2022 - 0/2023 [Co-Investigator]
- "Smart Farming using Machine Learning", Government Budget Grant 2018– [Principal Investigator]
- "Robust PID Control for Grid-Control Three Phase Inverter using Convex-Concave Optimization", Government Budget Grant 2017-2018 [Principal Investigator]
- "Transient response improvement of PVC process with disturbance from reflux condenser", SCG Chemical 2016-2017 [Principal Investigator]
- "Two-Degree-of-Freedom $\mathcal{H}_\infty$ Repetitive Control for Grid-Connected Inverter", Research Strengthening Project of the Faculty of Engineering KMUTT 2014-2016 [Principal Investigator]
- "Advanced Control System Design for Power Electronics and Motor Drives using a New Heuristic Optimization Algorithm," Research Strengthening Project of the Faculty of Engineering, King Mongkut's University of Technology Thonburi, 2014-2017 [Team Member]

Before 2011

- "Prototype development of the noise and vibration spectrum analyzer for industrial process", KMUTT, 2002, [Team Member]
- "Development of the seed moisture meter prototype using a microwave frequency range non-destructive method", KMUTT, 2003, [Team Member]

Scholarships for Students

Since 2011

- *M.Eng. Scholarship* "$\mathcal{H}_\infty$ Power Control for Grid–Connected Inverter" Energy Policy and Planning Office (EPPO) years 2012-2014
- *M.Eng. Scholarship* "2DoF Robust Repetitive Control for Grid–Connected Inverter" Energy Policy and Planning Office (EPPO) years 2015-2017

Professional Service

IEEE Control System Chapter Thailand

- Secretary 2016-2020

The Electrical Engineering/Electronics, Computer, Communications and Information Technology Association (ECTI)

- ECTI Technical Chair (System Control) (2020-2021)
- ECTI Board Committee (Secretary) (2024-)

Conference Organizing Committee

- EECON-25
- Publication Chair of The 2019 First International Symposium on Instrumentation, Control, Artificial Intelligence, and Robotics (ICA-SYMP 2019)
- Financial Chair of The 2021 Second International Symposium on Instrumentation, Control, Artificial Intelligence, and Robotics (ICA-SYMP 2021)
- Financial Chair of The 2023 Third International Symposium on Instrumentation, Control, Artificial Intelligence, and Robotics (ICA-SYMP 2023)

Technical Program Chair

- ICITEE 2017
- ECTI-CON 2020-2022
- ECTI-CARD 2020

Organized Session Chair

- ECTI-CON 2020-2024
- SICE 2021, 2023

Journal Publication

International Journal Papers with Impact Factor

1. Y. Atikankul, and **S. Boonto**, "An Extended Weighted Exponential Distribution and its Associated Regression Model," Songklanakarin Journal of Science and Technology, Vol. 46, No. 1, pp. 45-52, 2024 (Citescore Q3) ||
2. W. Kornmaneesang, S.-L. Chen, and **S. Boonto**, "Contouring Control of an Innovative Manufacturing System Based on Dual-Arm Robot," IEEE Transactions on Automation Science and Engineering , Vol. 19, No. 3, 2022, pp. 2042-2053 (WoS Q1)
3. Y. Atikankul, A. Thongteeraparp, W. Bodhisuwan, J. Qin, and **S. Boonto**, "The Zero-trancated Poisson-weighted Exponential Distribution with Applications," The Lobachevskii Journal of Mathematics, Vol. 42, No. 13, 2021, pp. 3088-3097 (Citescore Q3)
4. **S. Boonto**, and S. Puychaison, "Mouse Type BallBot Identification and Control using a Convex-Concave Optimization," Journal of Marine Science and Technology Taiwan , Vol. 28, No.5, pp. 404–410, 2020 (WoS Q4)
5. L. Kenlin, **S. Boonto**, and T. Nuchkrau, "On-line Self Tuning of Contouring Control for High Accuracy Robot Manipulators under Various Operations," *International Journal of Control, Automation and Systems*, Vol. 18, No. 7, 2020, pp. 1818–1828. (WoS Q2)
6. R. Körlin, **S. Boonto**, H. Werner, U. Starossek, " LMI-based Gain Scheduling for Bridge Flutter Control using Eccentric Rotational Actuators," *Optimal Control, Applications and Methods*, Vol. 33, No. 4, 2012, pp. 488–500. (WoS Q2)

International Journal Papers with Peer Review

1. V. Sittiarttakorn and **S. Boonto**, "Temperature Control and Stabilization of an Industrial Oven Using Thermoelectric Devices as the Stabilize Actuator," *Journal of the Japan Society of Applied Electromagnetic and Mechanics*, Vol. 27, No. 3, pp. 366-370, 2019
2. V. Sittiarttakorn and **S. Boonto**, "Hybrid Engine Model Using a Stirling Engine and a DC Motor,"*Journal of the Japan Society of Applied Electromagnetic and Mechanics*, Vol. 23, No. 3, 2015, pp. 563–566.

Conference Presentations

International Conference

1. P. Areerob, R. Sum, C. Khongprasongsiri, and **S. Boonto**, "Failure Detection from the Knocking Sounds Using Convolutional Neural Network," In Proceedings of the 2023 IEEE Region 10 Conference (TENCON 2023), Chiang Mai, Thailand, 31 Oct - 3 Nov, 2023, pp. 932–935
2. C. Khongprasongsiri, P. Areerob, **S. Boonto**, and W. Vongsantivanich, "Hardware Implementation of PID Autotuning with Efficient Particle Swarm Optimization," In Proceedings of The 20th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON 2023), Nakhonphanom, Thailand, May 9-12, 2023, pp. 1–4
3. P. Wongvivalvaitaya, **S. Boonto**, and R. Silapunt, "An Investigation of Surface Temperature Effect on Estrus Detection of Dairy Cows using Supervised Learning," In Proceedings of the 2023 Third International Symposium on Instrumentation, Control, Artificial Intelligence, and Robotics (ICA-SYMP 2023), Kasetsart University, Bangkok, Thailand, January 18-20, 2023, pp. 49–52

4. **S. Boonto**, C. Thabthimrattana, and W. Polwisate, "Two-Degree-of-Freedom Robust PID Controller Design for Unstable System: Using A Convex-Concave Optimization," In Proceedings of the 21st International Conference on Control, Automation and Systems (ICCAS 2021), Ramada Plaza Hotel, Jeju, Korea, October 12–15, 2021

5. P. Phowanna, **S. Boonto**, M. Konghirun, and W. Lenwari, " Inductance Estimation of IPMSM Using Affine Projection Algorithm," In Proceedings of The SICE Annual Conferene 2020, Chiang Mai, Thailand, September 23–26, 2020

6. I. Khuankrue, **S. Boonto**, Y. Tsujimura, "Modeling the Material-Inventory Transportation Problem Using Multi-Objective Optimization," In Proceedings of The SICE Annual Conferene 2020, Chiang Mai, Thailand, September 23–26, 2020

7. S. Puychaison, **S. Boonto**, "Mouse Type BallBot Identification and Control using a Convex-Concave Optimization," In Proceedings of the International Automatic Control Conference (CACS 2019), National Taiwan Ocean University, Keelung Taiwan, November 13–16, 2019 pp. 1-6

8. R. Chen, K. Li, **S. Boonto**, and T. Nuchkrua, "Contouring Control Consensus for Robot Manipulators," In Proceedings of *The SICE Annual Conference 2019*, Hiroshima University, Hiroshima, Japan, September 10–13, 2019 , pp. 443–448 (Finalists of Young Author's Award)

9. K. Li, R. Chen, T. Nuchkrua, and **S. Boonto**, "Dual Loop Compliant Control Based on Human Prediction for Physical Human-Robot Interaction," In Proceedings of *The SICE Annual Conference 2019*, Hiroshima University, Hiroshima, Japan, September 10–13, 2019, pp. 459–464

10. R. Wipulapong, **S. Boonto**, and W. Polwisate, "The Convex-Concave Optimization for the Design of a Robust Proportional-Resonant Controller for Grid-Connected Inverter," In Proceedings of *The SICE Annual Conference 2019*, Hiroshima University, Hiroshima, Japan, September 10–13, 2019, pp. 1398–1403

11. K. Li, T. Nuchkrua, **S. Boonto**,and Y. Yuan, "Sparse Bayesian Learning-Based Adaptive Impedance Control in Physical Human-Robot Interaction," In Proceedings of *2019 First InternationalSymposium on Instrumentation, Control, Artificial Intelligence, and Robotics (ICA-SYMP 2019)*, Chulalongkorn University, Bangkok, Thailand, January, 16–18, 2019 (best application paper award)

12. W. Kornmaneesang, S.-L. Chen, **S. Boonto**, "Contouring Control of a Free-Form Path for a Novel Machining System," In Proceedings of *2019 First InternationalSymposium on Instrumentation, Control, Artificial Intelligence, and Robotics (ICA-SYMP 2019)*, Chulalongkorn University, Bangkok, Thailand, January, 16–18, 2019

13. K. Li, T. Nuchkrau, H. Zhao, Y. Yuan, and **S. Boonto**, "Learning-based Adaptive Robust Control of Manipulated Pneumatic Artificial Muscle Driven by H_2-based Metal Hydride," In Proceedings of *14th IEEE International Conference on Automation Science and Engineering (CASE 2018)*, Technical University of Munich Campus Garching, Germany, August 20–24, 2018 , pp. 1284–1289

14. V. Sittiarttakorn, and **S. Boonto**, "Temperature Control and Stabilization of an Industrial Oven", In *Proceedings of the Asia-Pacific Symposium on Applied Electromagnetic and Mechanics (APSAEM 2018)*, Grand Inna Malioboro Hotel Yogyakarta, INDONESIA, July 24–27, 2018

15. T. Nuchkrau, W. Kornmaneesang, S.-L. Chen, and **S. Boonto**, "Precision Contouring Control of 5 DOF Dual-arm Robot Manipulators with Holonomic Constraints," In Proceedings of *2017 Asian Control Conference (ASCC 2017)*, Gold Coast Convention Centre, Australia, December 17–20, 2017, pp. 976–981

16. V. Sittiarttakorn, and **S. Boonto**, "Mobile Robot Multi-Paths Tracking Control Using Optical Coding", In Proceedings of *the 4th International Conference on Applied Electrical and Mechanical Engineering 2017 (ICAEME 2017)*, Nongkhai Thailand, August 31–September 2, 2017 (Best paper award)

17. T. Nuchkrua, S.-L. Chen, **S. Boonto**,"A Novel Technique of Dual-arm Robot Manipulators: Path-contouring Control Problem," In *Proceeding of the 13th IEEE International Conference on Control & Automation (ICCA 2017)*, Ohrid, Macedonia, July 3–6, 2017, pp. 867–871

18. P. Phowanna, **S. Boonto**, E. Mujjalinvimut, M. Konghirun, W. Lenwari, "Improved Performance of Sliding Mode Observer Using Parameter Adaptation in Sensorless IPMSM Drive," In *Proceedings of The 12th IEEE Conference on Industrial Electronics and Applications (ICIEA 2017)*, Siem Reap, Cambodia, June 18-20, 2017

19. T. Nuchkrua, S.-L. Chen, **S. Boonto**, "Adaptive Contouring Control for High-precision 5 DoF Robot Manipulators under Various Environments," In *Proceedings of the 2016 International Automatic Control Conference (CACS 2016)*, Evergreen Laurel Hotel,Taichung, Taiwan, Novemver 9-11, 2016

20. W. Sintanavevong, **S. Boonto**, S. Naetiladdanon, "Robust Repetitive Control with Feedforward Scheme for Stand-Alone Inverter," In *Proceedings of the 16th International Conference on Control, Automation and Systems*, HICO, Gyeongju, Korea, October 16-19, 2016, pp. 359–364

21. C. Thabthimratthana, S. Saelim, S. Tiewcharoen, **S. Boonto**, "Robust PID Controller Design Using Convex-Concave Optimization: Application to an Unstable System," To appear in *Proceedings of the 16th International Conference on Control, Automation and Systems*, HICO, Gyeongju, Korea, October 16-19, 2016, pp. 638–643

22. P. Phowanna, **S. Boonto**, M. Konghirun, "Online Parameter Identification Method for IPMSM Drive with MTPA," In *Proceedings of the 18th International Conference on Electrical Machines and Systems*, Pattaya City, Thailand, October 25-28, 2015

23. V. Sittiarttakorn, **S. Boonto**, "Hybrid Modeling Using a Stirling Engine and a DC Motor," In *Proceedings of the Asia-Pacific Symposium on Applied Electromagnetic and Mechanics (APSAEM 2014)*, National Chung Hsing University, Taichung, Taiwan, July 23-25, 2014

24. W. Sriart, **S. Boonto**, S. Naetiladdanon, W. Lenwari, "Grid Connected Inverter Control by Two-Degree-of-Freedom Robust H_∞ Repetitive," In *Proceedings of The 2014 International Conference on Electrical Engineering/Electronics,Computer, Telecommunications and Information Technology (ECIT-CON 2014)*, Nakhon Ratchasima, Thailand, May 14–17, 2014,

25. W. Sriart, **S. Boonto**, S. Naetiladdanon, W. Lenwari, "Two-Degree-of-Freedom Robust $\mathcal{H}_\infty$ Repetitive Control for Grid-Connected Inverter," In *Proceedings of the 11th IEEE International Conference on Control and Automation (ICCA 2014)*, Taichung, Taiwan, June 18-20, 2014, pp. 791–796

26. N. Patcharaprakiti, K. Kirtikara, A. Sanswang, **S. Boonto**, "Stability Analysis of a Photovoltaic Grid Connected Inverter Model Based on System Identification," In *Proceedings of the 2012 IEEE Region 10 Conference*, Cebu, Philippines, November 19–22, 2012, pp. 1–4.

27. A. Kominek, S. Remolina, **S. Boonto**, H. Werner, M. Garwon, and M. Schultalbers, "Low-Complexity LPV Input-Output Identification and Control of a Turbocharged Combustion Engine," In *Proceedings of the 51th IEEE Conference on Decision and Control*, Maui, HI., USA, December 10–13, 2012, pp. 4492–4497.

28. **S. Boonto** and W. Lenwari, "Two-Degree-of-Freedom $\mathcal{H}_\infty$ Control Design for Harmonic Current Control of Shunt Active Filters," In *Proceedings of the 15th IEEE International Conference on Harmonics and Quality of Power (ICHQP 2012)*, Hong Kong, June 2012, pp. 887–891

29. Q. Liu, G. Kaiser, **S. Boonto**, H. Werner, F. Holzmann, B. Chertien, M. Korte, "Two-Degree-of-Freedom LPV Control for a through-the-Road Hybrid Electric Vehicle via Torque Vectoring," In *Proceedings of the 50th IEEE Conference on Decision and Control and European Control Conference – CDC–ECC 2011*, Orlando, FL, USA, December 12–15, 2011, pp. 1274–1279.

30. I. Wior, **S. Boonto**, H. Abbas, H. Werner, "Modeling and Control of an Experimental pH Neutralization Plant using Neural Networks based Approximate Predictive Control," In *Proceedings of the 1st Virtual Control Conference*, Denmark, 22 Sep, 2010, (online).

31. **S. Boonto**, H. Werner, "Closed-Loop Identification of LPV Models Using Cubic Splines with Application to an Arm-Driven Inverted Pendulum," In *Proceedings of the 2010 American Control Conference – ACC2010*, Baltimore, Maryland, USA, June 30 - July 2, 2010, pp. 3100–3105

32. **S. Boonto**, H. Werner, "Closed-Loop System Identification of LPV Input-Output Models – Application to an Arm-Driven Inverted Pendulum," In *Proceedings of the 47th IEEE Conference on Decision and Control*, Cancun, Mexico , December 9–11, 2008, pp. 2606–2611

33. J. Witt, **S. Boonto**, H. Werner, "Approximate Model Predictive Control of a 3-DOF Helicopter," In *Proceedings of the 46th IEEE Conference on Decision and Control*, New Orleans, Louisiana USA, December 12–14, 2007, pp. 4501–4506

34. O. Supatti, **S. Boonto**, C. Prapanavarat, V. Moneyagul, "Design of an $\mathcal{H}_\infty$ Robust Controlled for Multimodule Parallel DC-DC Buck Converters with Average Current Mode Control," In *Proceedings of IEEE International Conference on Industrial Technology* , Bangkok, Thailand, December 11–14, 2002, pp. 992-997.

35. O. Supatti, **S. Boonto**, C. Prapanavarat, V. Moneyagul, "$\mathcal{H}_\infty$ Controller Design for Parallel DC-DC Buck Converters," In *Proceedings of 17th Korea Automatic Control Conf.*, Jeonbuk, Korea, October 16–19, 2002, pp. 1159 -1163.

National Conference

1. N. Dernlugkam, **S. Boonto**, P. Siriprala, "Identification and Control of a Half-scale Platform of Multi-Launcher Rocket System," In *Proceedings of the 36th Electrical Engineering Conference (EECON36)*, Kanchanaburi, Thailand, December 11-13, 2013. (in Thai)

2. C. Techawatcharapaikul, **S. Boonto**,"PI/PID Design and Tuning via LMI with Time Domain Constraint," In *Proceedings of the 41st Kasetsart University Annual Conference*, Bangkok, Thailand, February 2003. (in Thai)

3. S. Teratanajaru, **S. Boonto**, A. Chaisawadi,"On-line area-based computation method for first-order plus dead-time model system identification from step response," In *Proceedings of the 17th Conference on Mechanical Engineering Network of Thailand*, Prajeanburi, Thailand, October 2003.

4. P. Sritanauthaikarn, **S. Boonto**, A. Chaisawadi,"Linear Matrix Inequalities Based Controller Design for Crane System," In *Proceedings of the 17th Conference on Mechanical Engineering Network of Thailand*, Prajeanburi, Thailand, October 2003. (in Thai)