Curriculum vitae for Svante Gunnarsson

Svante Gunnarsson
Born June 10, 1959 in Torpa, Östergötland, Sweden

Degrees

1983: Master of Science (Applied Physics and Electrical Engineering), Linköping University, Sweden
1988: Doctor of Philosophy, (Automatic Control), Linköping University, Sweden
1995: Docent (Automatic Control), Linköping University, Sweden

Employments

1983 - 1988: PhD student in Automatic Control, Linköping University, Sweden
1989 - 2002: Associate Professor in Automatic Control, Linköping University, Sweden
2002 - : Professor in Automatic Control, Linköping University, Sweden

Temporary appointments

1988 - 1996: Project leader for the project *Adaptive systems* connected to the *Center for Industrial Information Technology* at Linköping University.
1997 - 2002: Project leader for the project *Reglerteknik för verkstadsindustrin* connected to the *Center for Industrial Information Technology* at Linköping University.
1996 - 2005: Project leader for the project *Control and supervision of industrial robots* within the VINNOVA Competence Center ISIS.
2008 - 2017: Research leader for the area Industrial Robotics within the VINNOVA Industry Excellence Center LINK-SIC.
1993: Member of the Program Board of the Mechanical Engineering Program at Linköping University.
1994 - 1996: Member of the Program Board of the Industrial Engineering and Management Program at Linköping University.
1997 - 2002: Member of the Program Board of the Applied Physics and Electrical Engineering Program at Linköping University.
2003 - 2006 : Chairman of the Program Board of the Applied Physics and Electrical Engineering Program at Linköping University.
2007 - 2014: Chairman of the Board for Electrical Engineering, Physics and Mathematics at Linköping University.
2010 - 2017: Head of Division of Automatic Control, Department of Electrical Engineering, Linköping Univesity.
1999 - 2009: Manager for *Center for Industrial Information Technology (CENIIT)* at Linköping University.

2015 - : CDIO-coordinator within The Faculty of Science and Engineering and Linköping University.
2015 - 2017: Center Director for the VINNOVA funded Industry Excellence Center LINK-SIC, Linköping University.
2017-: Center Director for the VINNOVA funded Competence Center LINK-SIC, Linköping University.
2000 - 2002: Director of undergraduate studies in Automatic Control.
2006: Chairman of the organizing committee for the 2nd International CDIO Conference, Linköping University, Sweden.
2011: Chairman of the program committee and of the organizing committe of 3:e Utvecklingskonferensen för Sveriges ingenjörsutbildningar, Linköping University, Sweden.
2014: Chairman of the organizing committee of Reglermöte 2014, Linköping University, Sweden.

External funding

2005 - 2008: Co-applicant of the project *Sensor integration with application in modeling and control of advanced industrial robots* funded by VR.

2008 - 2017: Co-applicant of the VINNOVA Industry Excellence Center LINK-SIC
2017 - : Co-applicant of the VINNOVA Competence Center LINK-SIC

International appointments

Reviewer of numerous journal and conference papers.

Member of the Assessment Panel for the School of Information Technology and Electrical Engineering (ITEE) within the University of Queensland Research Quality Assessment (UQRQA), 2006.

Reviewer for Physical Sciences division of the Free Competition program of the Netherlands Organisation for Scientific Research (NWO), 2008.

Guest researcher at Université catholique de Louvain, Belgium, Sep. - Oct. 1993.

Industry collaboration

Extensive industry collaboration with ABB Robotics via the VINNOVA Competence Center ISIS, the VINNOVA Industry Excellence Center LINK-SIC, and the VINNOVA Competence Center LINK-SIC. The collaboration has resulted in a large number of publications, several implementations in products, and one patent.

Educational experience

- 1997 - 2018: Examiner for the course Automatic Control (TSRT19, TSRT22) for the MSc program Industrial Engineering and Management.
- 1995 - 2012: Examiner for the course Automatic Control, advanced course (TSRT16, TSRT06) for the MSc program Mechanical Engineering.
- 2015 - 2019: Examiner for Automatic Control, advanced course (TSIU04) for the BSc program in Electronics.
- 2015 - 2019: Examiner for Automatic Control (TSIU06) for the BSc program in Mechanical Engineering.
- 1990 - 2017: Examiner for more than sixty MSc Theses.
- Educational awards: Rector's prize for excellent teaching within the Institute of Technolgy, Linköping University (1993). The annual award Gyllen Moroten from the students at the Institute of Technology, Linköping University (2011). Seven times recipient of the "Iplom" for excellent teaching from the students within the Industrial Engineering and Management program, Institute of Technology, Linköping University. Three nominations to the prize "Gyllene Skiftnyckeln" for excellent teaching by students from Mechanical Engineering.
- Main or co-author of more than ten journal and conference papers within engineering education.
- Education managment: Chairman of the Program Board of the Applied Physics and Electrical Engineering Program at Linköping University (2003-2006). Chairman of the Board for Electrical Engineering, Physics and Mathematics at Linköping University (2007-2014).

Awards and prizes

The IFAC *Automatica Prize Paper Award* for the paper *Adaptation and tracking in system identification - A survey*, published in *Automatica* 1990.

Rector's prize for excellent teaching within the Institute of Technolgy, Linköping University, 1993

Seven times recipient of the "Iplom" for excellent teaching from the students within the Industrial Engineering and Management program, Institute of Technology, Linköping University.

The annual award Gyllen Moroten from the students at the Institute of Technology, Linköping University, 2011.

Main author of the application from the Automatic Control and Vehicular Divisions at Linköping University leading to the award Framstående Utbildningsmiljö (Centre of Excellent Quality in Higher Education) awarded by Högskoleveret (The Swedish National Agency for Higher Education), 2007.

Co-author of the application from the engineering program Applied Physics and Electrical Engineering leading to the award Årets Teknikutbildning (Engineering Education of the Year) awarded by Teknikföretagen, 2007.

Publications

Author or co-author of more than 30 journal papers in international journals with review procedure. Author or co-author of more than 60 conference papers. One patent.

Publications

[1] S. Gunnarsson. *Frequency domain aspects of modeling and control in adaptive Systems*. PhD thesis, Linköping University, Linköping, Sweden, 1988.

[2] S. Gunnarsson and L. Ljung. Frequency domain tracking characteristics of adaptive algorithms. *IEEE Transactions on Acoustics, Speech and Signal Processing*, 37:1072–1089, 1989.

[3] L. Ljung and S. Gunnarsson. Adaptation and tracking in system identification – a survey. *Automatica*, 26:7–21, 1990.

[4] S. Gunnarsson and B. Wahlberg. Some asymptotic results in recursive identification using Laguerre models. *International Journal of Adaptive Control and Signal Processing*, 5:313–333, 1991.

[5] S. Gunnarsson. Frequency domain accuracy of recursively identified ARX models. *International Journal Control*, 54:465–480, 1991.

[6] S. Gunnarsson. On the quality of recursively identified fir models. *IEEE Transactions on Signal Processing*, 40:679–682, 1992.

[7] S. Gunnarsson. On some asymptotic uncertainty bounds in recursive least squares identification. *IEEE Transactions on Automatic Control*, 38:1685–1688, 1993.

[8] H. Hjalmarsson, S. Gunnarsson, and M. Gevers. Model-free tuning of a robust regulator for a flexible transmission system. *European Journal of Control*, 1:148–156, 1995.

[9] F. Gustafsson, S. Gunnarsson, and L. Ljung. Shaping frequency-dependent time resolution when estimating spectral properties with parametric models. *IEEE Transactions on Signal Processing*, 45, 1997.

[10] H. Hjalmarsson, M. Gevers, S. Gunnarsson, and O. Lequin. Iterative feedback tuning: Theory and applications. *IEEE Control Systems*, 18:26–41, 1998.

[11] M. Norrlöf and S. Gunnarsson. Disturbance aspects of iterative learning control. *Engineering Aspects of Artificial Intelligence*, 14:87–94, 2001.

[12] S. Gunnarsson and M. Norrlöf. On the Design of ILC Algorithms Using Optimization. *Automatica*, 37:2011–2016, 2001.

[13] M. Norrlöf and S. Gunnarsson. Time and frequency domain convergence properties in iterative learning control. *International Journal of Control*, 75:1114–1126, 2002.

[14] M. Norrlöf and S. Gunnarsson. Experimental comparison of some classical iterative learning control algorithms. *IEEE Transactions on Robotics and Automation*, 18:636–641, 2002.

[15] M. Östring, S. Gunnarsson, and M. Norrlöf. Closed loop identification of an industrial robot containing flexibilitie. *Control Engineering Practice*, 11:291–300, 2003.

[16] S. Gunnarsson, V. Collignon, and O. Rousseaux. Tuning of a decoupling controller for a 2×2 system using Iterative Feedback Tuning. *Control Engineering Practice*, 11:1035–1041, 2003.

[17] M. Östring and S. Gunnarsson. Recursive identification of physical parameters in a flexible robot arm. *Asian Journal of Control*, 6:407–414, 2004.

[18] M. Norrlöf and S. Gunnarsson. A note on causal and cite iterative learning control algorithms. *Automatica*, 41:345–350, 2005.

[19] S. Gunnarsson and M. Norrlöf. On the disturbance properties of high order iterative learning control algorithms. *Automatica*, 42:2031–2043, 2006.

[20] R. Karlsson, D. Törnqvist, A. Hansson, and S. Gunnarsson. Automatic control project course: A positioning and control application for an unmanned aerial vehicle. *World Transactions on Engineering and Technology Education*, 5(2):291–294, 2006.

[21] J. Malmqvist, K. Edström, Svante Gunnarsson, and S. Östlund. The application of cdio standards in the evaluation of swedish engineering degree programmes. *World Transactions on Engineering and Technology Education*, 5(2), Oct 2006.

[22] P. Armstrong, J. Bankel, Svante Gunnarsson, J. Keesee, and P. Oosthuizen. Meeting the cdio requirements: an international comparison of engineering curricula. *World Transactions on Engineering and Technology Education*, 5(2), Oct 2006.

[23] S. Gunnarsson, M. Norrlof, E. Rahic, and M. Özbek. On the use of accelerometers in iterative learning control of a flexible robot arm. *International Journal of Control*, 80:363–373, 2007.

[24] M. Amirijoo, J. Hansson, S.H. Son, and Svante Gunnarsson. Experimental evaluation of linear time-invariant models for feedback performance control in real-time system. *Real-Time Systems Journal*, 35(3), Feb 2007.

[25] E. Wernholt and S. Gunnarsson. Estimation of nonlinear effects in frequency domain identification of industrial robots. *IEEE Transactions on Instrumentation and Measurement*, 57(4), April 2008.

[26] M. Amirijoo, J. Hansson, S. Gunnarsson, and S.H. Son. Quantifying and suppressing the measurement disturbance in feedback controlled real-time systems. *Real-Time Systems Journal*, 36, 2008.

[27] S. Moberg, J. Öhr, and S. Gunnarsson. A benchmark problem for robust feedback control of a flexible manipulator. *IEEE Transactions on Control System Technology*, 17(6), 2009.

[28] J. Wallén, M. Norrlöf, and S. Gunnarsson. A framework for analysis of observer-based ILC. *Asian Journal of Control*, 13(1):3–14, 2011.

[29] A. Carvalho Bittencourt and S. Gunnarsson. Static Friction in a Robot Joint: Modeling and Identification of Load and Temperature Effects. *Journal of Dynamic Systems Measurement, and Control*, 134(5), 2012.

[30] T. Svensson and S. Gunnarsson. A Design-Build-Test course in electronics based on the CDIO framework for engineering education. *International Journal of Electrical Engineering Education*, 49(4):349–364, 2012.

[31] J. Wallén, S. Gunnarsson, and M. Norrlöf. Analysis of boundary effects in iterative learning control. *International Journal of Control*, 86(3):410–415, 2013.

[32] A. Carvalho Bittencourt, K. Saarinen, S. Sander-Tavallaey, S. Gunnarsson, and M. Norrlöf. A data-driven approach to diagnostics of repetetive processes in the distribution domain - Applications to gearbox diagnostics in industrial robots and rotating machines. *Mechatronics*, 24(8):1032–1041, 2014.

[33] Johanna Wallen Axehill, Isolde Dressler, Svante Gunnarsson, Anders Robertsson, and Mikael Norrlöf. Estimation-based ILC applied to a parallel kinematic robot. *Control Engineering Practice*, 33, 2014.

[34] G. Hendeby, F. Gustafsson, N. Wahlström, and S. Gunnarsson. Platform for teaching sensor fusion using a smartphone. *International Journal of Engineering Education*, 32, 2017.

[35] P. Leissner, S. Gunnarsson, and M. Norrlöf. Some controllability aspects for Iterative learning control. *Asian Journal of Control*, 21(3):1057–1063, 2019.

[36] M.A. Costa, B. Wullt, M. Norrlöf, and S. Gunnarsson. Failure detection in robotic arms using statistical modeling, machine learning and hybrid gradient boosting. *Measurement*, 146:425–436, 2019.

[37] F. Adib Yaghmaie, S. Gunnarsson, and F.L. Lewis. Output regulation of unknown linear sytems using average cost reinforcement learning. *Accepted for publication in Automatica*, 2019.

[38] S. Gunnarsson. On the properties of pole placement regulators. In *Proceedings of the 25th IEEE Conference on Decision and Control*, pages 114–116, Athens,Greece, 1986.

[39] S. Gunnarsson. On the variance of recursive transfer function estimates of systems with FIR-structure. In *Proceedings of the 25th IEEE Conference on Decision and Control*, pages 2029–2030, Athens,Greece, 1986.

[40] S. Gunnarsson. Robustness in adaptive control from a frequency domain perspective. In *Preprints of the IFAC Symposium on Adaptive Systems in Control and Signal Processing*, pages 433–437, Glasgow,UK, 1989.

[41] S. Gunnarsson and L. Ljung. Frequency domain description of the tracking capability and disturbance rejection trade-off in recursive identification. In *Proceedings of the IEEE Conference on Acoustics, Speech and Signal Processing*, pages 2077–2080, Glasgow,UK, 1989.

[42] P. Krus and S. Gunnarsson. Adaptive control of hydraulic actuators with flexible mechanical loads. In *9th International Symposium on Fluid Power*, pages 149–158, Bath,UK, 1990.

[43] S. Gunnarsson. Model quality in recursive identification of time varying systems with ARX structure. In *Proceedings of the 1990 American Control Conference*, pages 1909–1914, San Diego,California, 1990.

[44] P. Krus and S. Gunnarsson. Adaptive compensation of deformations in mechanical structures controlled by hydraulic actuators. In *Preprints of the 11th IFAC World Congress*, pages 51–55, Tallin,Estonia, 1990.

[45] S. Gunnarsson and B. Wahlberg. Some asymptotic results in recursive identification using Laguerre models. In *Proceeding of the 29th IEEE Conference on Decision and Control*, pages 1068–1073, Honolulu,Hawaii, 1990.

[46] S. Gunnarsson. On the performance of the recursive least squares method in the presence of bounded disturbances. In *Proceeding of the 30th IEEE Conference on Decision and Control*, pages 762–763, Brighton,UK, 1991.

[47] S. Gunnarsson and P. Krus. LQG control of a hydraulic actuator with a flexible mechanical load. In *Preprints of the 12th IFAC World Congress*, pages 469–472, Sydney, Australia, 1993.

[48] S. Gunnarsson and P. Krus. LQG control of a flexible mechanical structure using hydraulic actuators. In *Modeling and Simulation, Sixth Bath International Fluid Power Workshop*, pages 280–295, Bath, United Kingdom, 1993.

[49] P. Krus and S. Gunnarsson. Adaptive control of a hydraulic crane using on-line identification. In *The Third Scandinavian International Conference on Fluid Power*, pages 363–388, Linköping, Sweden, 1993.

[50] P. Krus and S. Gunnarsson. Numerical optimization for a self tuning electro-hydraulic control system. In *Second JHPS International Symposium on Fluid Power*, pages 631–638, Tokyo, Japan, 1993.

[51] S. Gunnarsson. On covariance modification and regularization in recursive least squares identification. In *Preprints of the 10th IFAC Symposium on System Identification*, pages 661–666, Copenhagen, Denmark, 1994.

[52] F. Gustafsson, S. Gunnarsson, and L. Ljung. On Time-Frequency Resolution of Signal Properties using Parametric Techniques. In *Proceedings of the 33rd IEEE Conference on Decision and Control*, volume 3, pages 2259–2264, Orlando, Florida, 1994.

[53] H. Hjalmarsson, S. Gunnarsson, and M. Gevers. A convergent iterative restricted complexity control design scheme. In *Proceedings of the 33rd IEEE Conference on Decision and Control*, pages 1735–1740, Orlando, Florida, 1994.

[54] H. Hjalmarsson, S. Gunnarsson, and M. Gevers. Optimality and sub-optimality of iterative identification and control design schemes. In *1995 American Control Conference*, Seattle, Washington, 1995.

[55] H. Hjalmarsson, S. Gunnarsson, and M. Gevers. Model free tuning of a robust regulator for a flexible transmission system. In *1995 European Control Conference*, Rome, Italy, 1995.

[56] P. Krus and S. Gunnarsson. Adaptive control with impact detection of a hydraulic actuator connected to a flexible mechanical structure. In *The Fourth Scandinavian International Conference on Fluid Power*, Tampere, Finland, 1995.

[57] S. Gunnarsson. Combining Tracking and Regularization in Recursive Least Squares Identification. In *Proceedings of the 35th IEEE Conference on Decision and Control*, pages 2551–2552, Kobe,Japan, 1996.

[58] S. Gunnarsson and M. Millnert. Computer supported control education from a Linköping perspective. In *4th IFAC Symposium on Advances in Control Education*, pages 45–48, Istanbul, Turkey, 1997.

[59] S. Gunnarsson and M. Norrlöf. On the Use of Learning Control for Improved Performance in Robot Control Systems. In *1997 European Control Conference*, Brussels,Belgium, 1997.

[60] S. Gunnarsson and M. Norrlöf. Some Experiences of the Use of Iterative Learning Control for Performance Improvement in Robot Control Systems. In *IFAC Symposium in Robot Control 1997*, pages 379–383, Nantes, France, 1997.

[61] S. Gunnarsson, O. Rosseaux, and V. Collignon. Iterative Feedback Tuning Applied to Robot Joint Controllers. In *Proceedings of the 14th IFAC World Congress*, Beijing, China, 1999.

[62] S. Gunnarsson and M. Norrlöf. Some Aspects of an Optimization Approach to Iterative Learning Control. In *Proc of the 38th IEEE Conference on Decision and Control*, Phoenix, Arizona, 1999.

[63] M. Norrlöf and S. Gunnarsson. A frequency domain analysis of a second order iterative learning control algorithm. In *Proc. of the 38th IEEE Conference on Decision and Control*, Phoenix, Arizona, Dec 1999.

[64] S. Gunnarsson and M. Norrlöf. Iterative learning control of a flexible mechanical system using accelerometers. In *IFAC 6th symposium on robot control, SYROCO*, Vienna, Austria, Sep 2000.

[65] M. Norrlöf and S. Gunnarsson. A model based iterative learning control method applied to 3 axes of a commercial industrial robot. In *IFAC 6th symposium on robot control, SYROCO*, Vienna, Austria, Sep 2000.

[66] M. Östring, S. Gunnarsson, and M. Norrlöf. Closed loop identification of physical parameters of an industrial robot. In *32nd International Symposium on Robotics*, Seoul, Korea, April 2001.

[67] S. Gunnarsson and M. Östring. On regulator stability in control of flexible mechanical systems. In *32nd International Symposium on Robotics*, Seoul, Korea, April 2001.

[68] M. Andersson, S. Gunnarsson, T. Glad, and M. Norrlöf. A simulation and animation tool for studying multivariable control. In *15th IFAC World Congress*, Barcelona, Spain, July 2002.

[69] M. Norrlöf and S. Gunnarsson. Disturbance aspects of high order iterative learning control. In *IFAC World Congress*, Barcelona, Spain, July 2002.

[70] M. Norrlöf and S. Gunnarsson. Some new results on current iteration trackin error ilc. In *Asian Control Conference*, Singapore, September 2002.

[71] M. Östring and S. Gunnarsson. Recursive identification of physical parameters in a flexible robot arm. In *Proceedings of the 4th Asian Control Conference (ASCC 2002)*, Singapore, September 2002.

[72] G. Hovland, S. Hanssen, E. Gallestey, S. Moberg, T. Brogårdh, S. Gunnarsson, and M. Isaksson. Nonlinear identification of backlash in robot transmissions. In *Proc. of the 33rd International Symposium on Robotics*, Stockholm, Sweden, October 2002.

[73] Svante Gunnarsson and Mikael Norrlöf. Iterative learning control of a flexible robot arm using accelerometers. In *IEEE Conference on Control Applications*, Taipei, Taiwan, Sep 2004.

[74] M. Amirijoo, J. Hansson, S.H. Son, and S. Gunnarsson. Robust quality management for differentiated imprecise data services. In *25th IEEE International Real-time systems symposium*, Lisabon, Portugal, Dec 2004.

[75] Erik Wernholt and Svante Gunnarsson. On the use of a multivariable frequency response estimation method for closed loop identification. In *43rd IEEE Conference on Decision and Control*, Nassau, Bahamas, Dec 2004.

[76] K.F. Berggren, S. Gunnarsson, T. Svensson, and I. Wiklund. Development of the Applied physics and electrical engineering (Y) program at Linköping university through the participation in the CDIO initiative. In *8th UICEE Annual Conference on Engineering Education*, Kingston, Jamaica, February 2005.

[77] M. Amirijoo, J. Hansson, S. Gunnarsson, and S.H. Son. Enhancing feedback control scheduling performance by on-line quantification and suppression of measurement disturbances. In *11th IEEE Real-time and Embedded Technology and Applications Symposium*, San Francisco, California, March 2005.

[78] A. Fujimori, S. Gunnarsson, and M. Norrlöf. A gain scheduling control of nonlinear systems along a reference trajectory. In *16th IFAC World Congress*, Prague, Czech Republic, July 2005.

[79] S. Gunnarsson. On identification of a flexible mechanical system using decimated data. In *16th IFAC World Congress*, Prague, Czech Republic, July 2005.

[80] Mehdi Amirijoo, Nicolas Chaufette, Jörgen Hansson, Sang Son, and Svante Gunnarsson. Generalized performance management of multi class real-time imprecise data services. In *IEEE Real Time Systems Symposium*, Miami, Florida, December 2005.

[81] E. Wernholt and S. Gunnarsson. Nonlinear identification of a physically parameterized robot model. In *14th IFAC Symposium on System Identification*, Newcastle, Australia, March 2006.

[82] E. Wernholt and S. Gunnarsson. Detection and estimation of nonlinear distortions in industrial robots. In *IEEE Instrumentation and Measurement Technology Conference*, Sorrento, Italy, April 2006.

[83] J. Wallén, M. Norrlöf, and S. Gunnarsson. Experimental evaluation of ilc applied to a six degrees-of-freedom industrial robot. In *2007 European Control Conference*, Kos, Greece, 2007.

[84] M. Amirijoo, P. Brännström, J. Hansson, S. Gunnarsson, and S. Son. Toward adaptive control of qos-importance decoupled real-time systems. In *IEEE International Workshop on Feedback Control Implementation and Design in Computing Systems and Networks*, Munich, Germany, 2007.

[85] E. Wernholt and S. Gunnarsson. Analysis of methods for multivariable frequency response function estimation in closed loop. In *46th IEEE Conference on Decision and Control*, New Orleans, Louisiana, Dec 2007.

[86] Svante Gunnarsson, I. Wiklund, T.Svensson, A. Kindgren, and S. Granath. Large scale use of the CDIO syllabus in formulation of program and course goals. In *Proceedings of the 3rd International CDIO Conference*, Cambridge, Massachusetts, June 2007.

[87] Stig Moberg, J. Öhr, and Svante Gunnarsson. A benchmark problem for robust control of a multivariable nonlinear flexible manipulator. In *Proc. 17th IFAC World Congress*, 2008.

[88] J. Wallén, M. Norrlöf, and S. Gunnarsson. Arm-side evaluation of ILC applied to a six-degrees-of-freedom industrial robot. In *Proc. 17th IFAC World Congress*, 2008.

[89] S. Gunnarsson and I. Klein. Computer supported learning and assessment in engineering education. In *Proceedings of the 4th International CDIO Conference*, June 2008.

[90] J. Malmqvist, S. Gunnarsson, and M.E.Vigild. Faculty professional competence development programs - comparing approaches from three universities. In *Proceedings of the 4th International CDIO Conference*, June 2008.

[91] S. Gunnarsson, H. Herbertsson, A. Kindgren, I. Wiklund, L. Willumsen, and M. Vigild. Using the CDIO syllabus in formulation of program goals - experiences and comparisions. In *Proceedings of the 5th International CDIO Conference*, June 2009.

[92] J. Wallén, M. Norrlöf, and S. Gunnarsson. ILC applied to a flexible two-link robot model using sensor-fusion-based estimates. In *Proceedings of 48th IEEE Conference on Decision and Control, Shanghai, China*, pages 458–463, December 2009.

[93] S. Gunnarsson, M. Klofsten, and A. Bergek. Integrating entrepreneurship in DBT project courses at Linköping university. In *Proceedings of the 6th International CDIO Conference*, Montreal, Canada, June 2010.

[94] J. Wallen, I. Dressler, A. Robertsson, M. Norrlöf, and S. Gunnarsson. Observer-based ILC applied to the gantry-tau parallel kinematic robot. In *18th IFAC World Congress*, 2011.

[95] T. Svensson and S. Gunnarsson. Teaching Project Courses in Large Scale Using Industry Like Methods - Experiences After Ten Years. In *Proceedings of 8th International CDIO Conference, Brisbane, Australia,July 1-4*, 2012.

[96] A. Samuelsson, A. Carvalho Bittencourt, K. Saarinen, S. Sander-Tavallaey, M. Norrlöf, H. Andersson, and S. Gunnarsson. Simulation based evaluation of fault detection algorithms with applications to war diagnosis in manipulators. In *19th IFAC World Congress*, 2014.

[97] J. Cerqueira, A. Rezende, W. Barosso Magno, and S. Gunnarsson. Introduction of the CDIO Framework ay the Military Institue of Engineering in Brazil. In *Proceedings of 12th International CDIO Conference, Turku, Finland*, 2016.

[98] S. Gunnarsson, Y. Jung, C. Veibäck, and T. Glad. IO (Implement and Operate) First in an Automatic Control Context. In *Proceedings of 12th International CDIO Conference, Turku, Finland*, 2016.

[99] J. Norén, E. Hedberg, M. Norrlöf, and S. Gunnarsson. Industrial robot tool position estimation using inertial measurements in a complementary filter and an ekf. In *20th IFAC World Congress*, 2017.

[100] S. Gunnarsson. Automatic control education in a CDIO perspective. In *20th IFAC World Congress*, 2017.

[101] V. Johansson, S. Moberg, E. Hedberg, M. Norrlöf, and S. Gunnarsson. A learning approach for feed-forward friction compensation. In *12th IFAC Symposium on Robot Control SYROCO*, 2018.

[102] E. Hedberg, M. Norrlöf, S. Moberg, and S. Gunnarsson. Comparing Feedback Linearization and Jacobian Linearization for LQ Control of an Industrial Manipulator. In *Proccedings of the 12th IFAC Symposium on Robot Control SYROCO*, 2018.

[103] A. Fahlgren, A. Thorsell, K. Kågedal, Mats Lindahl, and S. Gunnarsson. Adapting the CDIO framework to biomedicine education. In *14th International CDIO Conference, Kanazawa, Japan*, 2018.

[104] C. Santi and S. Gunnarsson. A conceive-design project in the first semester of the engineering programs at Methodist University of Sao Paulo. In *14th International CDIO Conference, Kanazawa, Japan*, 2018.

[105] A. Fahlgren, M. Larsson, M. Lindahl, A. Thorsell, K. Kågedal, and S. Gunnarsson. Design and outcome of a CDIO syllabus survey for a biomedicine program. In *15th International CDIO Conference, Aarhus, Denmark*, 2019.

[106] S. Gunnarsson, H. Herbertsson, and H. Örman. Using course and program matrices as components in a quality assurance system. In *15th International CDIO Conference, Aarhus, Denmark*, 2019.

[107] J. Malmqvist, M. Knutsson Wedel, U. Lindqvist, K. Edström, A. Rosén, T. Fruergaard Astrup, M. Vigild, P. Munkebo Hussman, A. Grom, R. Lyng, S. Gunnarsson, H. Leong-Wee Kwee Huay, and A. Kamp. Towards CDIO standards 3.0. In *15th International CDIO Conference, Aarhus, Denmark*, 2019.

[108] F. Adib Yaghmaie and S. Gunnarsson. A new result on robust adaptive dynamic programming for uncertain partially linear systems,. In *Accepted for publication at the 58th IEEE Conference on Decision and Control*, 2019.

[109] P. Fagrell, A. Fahlgren, and S. Gunnarsson. Whatever works works. Different ways for external stakeholders to contribute to quality and relevance assurance in higher education in Sweden,,. In *Accepted for publication at the SRHE (Society for Research into Higher Education) Annual Conference 2019, Wales*, 2019.

[110] S. Gunnarsson, M. Norrlöf, G. Hovland, U. Carlsson, Torgny Brogårdh, T. Svensson, and S. Moberg. High accuracy performance of an industrial robot. Swedish Patent Application No. 0001312-8, 2000.