

Profile of Dr. S. Rominus Valsalam

Dr. S. ROMINUS VALSALAM was graduated in Mathematics from the Madurai University in 1977. He received B.Tech degree in Instrument Technology in 1980 from the Madras Institute of Technology, Anna University, Chennai. He took M.S Degree in Control Engineering from the Indian Institute of Technology, Chennai in 1989. He has been awarded the Degree of Doctor of Philosophy by the Anna University, Chennai during November, 2003. The title of his Ph.D thesis is “**Modelling, Simulation and Adaptive Optimal Control of a 210 MW Boiler**”. The thesis offers a comprehensive integrated mathematical model for a 210 MW coal fired boiler and appropriate optimization strategies for the adaptive predictive control of main steam temperature in Thermal power plants.

He joined with the Kerala State Electronics Development Corporation (Keltron) Ltd., Thiruvananthapuram as Project Engineer in 1980 and worked in the System Engineering, Research & Development and Project execution disciplines till 1988. Since then, he has been working with the Centre for Development of Advanced Computing (CDAC), Thiruvananthapuram, a Scientific Society of the Ministry of Communications & Information Technology, Government of India. He is currently working as the Associate Director & Head of the Department of Control and Instrumentation in CDAC. He is also the Director of the ER&DCI Institute of Technology (ERDCIT) of CDAC Thiruvananthapuram. He has been a faculty member for the M.Tech Programme offered by the Cochin University of Science & Technology in “VLSI and Embedded Systems” at the ER&DCIT. Now under the APJ Abdul Kalam Technological University, he is a faculty member in the same institute for the M.Tech Programmes in “VLSI and Embedded Systems” and “Cyber Forensics and Information Security” disciplines as well.

He has 36 years of experience in Research and Development activities. His R&D experience encompasses System Design & Development, Engineering, Installation and Commissioning of Computerised Control and Instrumentation and SCADA systems for Thermal Power Plants, Hydroelectric Power Plants, Oil Installations, Integrated Steel Plants, Cement Plants, Process and Petrochemical Industries. He has published 63 papers in International and National journals, conferences, seminars and workshops. His research interests include Process Modelling, Optimization, Digital Signal Processing, Kalman Filtering, State Estimation and Prediction, Adaptive Optimal Control, Neuro-Fuzzy-Genetic Intelligent System technologies, Embedded Systems, Data Fusion, Machine Learning, MEMS / Nano Technology, High Performance Computing , IT in Water Resources sustainability and SCADA Cybersecurity.

He is a Senior member of Institution of Electrical and Electronics Engineers (IEEE) and FELLOW of The Institution of Engineers (India). He has filed patent applications for seven inventions, out of which one patent has been awarded on 11-10-2010 and the other six are under the review process.

A. PUBLICATIONS

1. S. Rominus Valsalam, "Optimization of Main Steam Temperature Control for Thermal Power Plants", International symposium on High Technology in Power Engineering, PP 65 – 86, January 1987, New Delhi.
2. S. Rominus Valsalam and Dr. C. Eswaran, "Optimal Prediction and Control of Steam Temperature in Thermal Power Plants", AMSE periodical on MODELLING, SIMULATION AND CONTROL (France), Vol. 25, No.4 PP 1- 44, 1989.
3. S. Rominus Valsalam and Dr. C. Eswaran, "Optimal Steam Temperature Control in Thermal Power Plants", 35th Annual South Eastern Conference of Instrument Society of America (ISA), Pensacola, Florida, May 23 – 25, 1989.
4. S. Rominus Valsalam, "Optimization of Main Steam Temperature Control for Thermal Power Plants", URJA journal, Vol. 26, No. 3, 51 – 61, September 1989.
5. George Varkey, P.S Janardhanan, S. Rominus Valsalam, B. Ramani, K.C. Mathew and R. Rajaram, "Distributed computing over a network for process automation in steel melting shop", 2nd International seminar on Industrial Electronics and Control & Instrumentation (INTRONICS 89) conducted by IEEMA, PP 351 – 377, September 28 – 29, 1989.
6. S. Rominus Valsalam, B. Ramani, K.C. Mathew, "Distributed Control System for Steel melt shop automation at Visakhapatnam Steel Plant", ER &DC Annual Seminar (ERDC - 90), PP 7.47 – 7.64, May 22 – 23, 1990.
7. S. Rominus Valsalam, "Modern Trends in Process Control for Integrated Steel Plants", ERDC Annual Seminar (ERDC - 91), Thiruvananthapuram, 24- 25 April 1991.
8. Dr. S. R. Uttarwar and S. Rominus Valsalam, "Instrumentation & Control – An Overview", Workshop on Control & Instrumentation at Fluid Control Research Institute (FCRI) , Palghat, September 1991.
9. Ramesh C Dutt, S. Rominus Valsalam, R. Sreekumar and M.G. Narayanan Nair, "Distributed Energy Management System for Integrated Steel Plants" All India Seminar on Process Automaion in Industry, Jamshedpur, 19 – 20, April, 1991.
10. Rominus Valsalam and N. Krishnan, "Design of Energy Management System for Bhilai Steel Plant", ERDC – 92, Thiruvananthapuram, 1- 2, May, 1992.
11. Rominus Valsalam, N. Krishnan and K.R. Mohandas, "Computerised Energy Management System for Bhilai Steel Plant", International Seminar on Automation & Control Systems for Process Industries, New Delhi, 20 – 21, November, 1992.
12. Rominus Valsalam and George Varkey, "Retrofit of Data Acquisition Systems for Kolaghat Thermal Power Station", ERDC – 93, Thiruvananthapuram, 29 – 30 April, 1993.
13. S. Rominus Valsalam, V. Muralidharan, N. Krishnan and T.K. Sarkar, "Implementation of an Energy Management System for an Integrated Steel Plant", Exhibition and Seminar, Beijing, China, 7 – 11 July, 1997.
14. S. Rominus Valsalam, V. Muralidharan, and N. Krishnan, "Neuro – Fuzzy Control System for Energy Automation in Integrated Steel Plants ", Proceedings of the National Conference on Affordable Science & Technology for rural Advancement (ASTRA / ERDC 97), Thiruvananthapuram, 8 – 9 May 1997, PP – 4.25 – 4.36.
15. S. Rominus Valsalam, V. Muralidharan, N. Krishnan, T.K. Sarkar and Prof. H.P. Khincha, "Implementation of Energy Management System for an Integrated Steel Plant", IEEE Energy Management and Power Delivery Conference (EMPD '98), Singapore, 3 –5 March 1998, PP: 661 – 666.

- 16 S. Rominus Valsalam, V. Muralidharan, and N. Krishnan, "Implementation of Energy Management System for an Integrated Steel Plant", International Conference on Trends in Industrial Measurements and Automation (TIMA - 99), Chennai, 7 – 11 January 1999.
- 17 Dr. S. Ranganathan and S. Rominus Valsalam, "Design and Development of a Dynamic model for Optimal Control of Power Plant Boiler", National Symposium on Instrumentation, Bangalore, November 8 – 11, 2000.
- 18 Dr. S. Ranganathan, P. Kanagasabhapathy, S. Rominus Valsalam, P. Ponnovian and Lavanya Krishnaswamy, "Mathematical model of Furnace chamber of Boiler" 3rd International Conference on Trends in Industrial Measurements and Automation (TIMA - 2001), 17 – 19 August 2001, Chennai.
- 19 Dr. S. Ranganathan S. and Rominus Valsalam S. "Modelling and Analysis of Boiler Furnace in a 210 MW Coal fired Thermal Power Plant", AMSE Journal- Modelling, Simulation & Control, France, Vol. 72, No.4, 2003.
- 20 Dr. S. Ranganathan S. and Rominus Valsalam S, "Least Squares Model of a Thermal Power Plant Boiler", AMSE International Conference on Business and Modelling (BM'03), La Habana (Cuba), 23-25 April 2003.
- 21 Dr. S. Ranganathan S. and Rominus Valsalam S, "Modelling and Simulation of Boiler Drum Dynamics in a 210 MW Coal fired Thermal Power Plant", Mediterranean Conference on Modelling and Simulation (MCMS'03), Reggio Calabria (Italy), 25-27 June 2003.
- 22 Dr. Rominus Valsalam. S, "Applications of Kalman Filtering in Industrial Control", Proceedings of Awareness Seminar on Digital Signal Processing, (ASDSP 2003), Thiruvananthapuram, July 2003.
- 23 Dr. George Varkey, Dr. S. Rominus Valsalam and K. Raveendran Nair, "Acoustic Modelling and Simulation of Naval Vessels", UDT Europe 2007 International Conference on Undersea Defence Technology, La Mostra d'Oltremare, Naples, Italy, 5 – 7 June 2007.
- 24 Dr. Rominus Valsalam. S and Anish satyan. S, "Intelligent SCADA System for a chain of Hydel Power Plants", flotek.g Global Conference and Exhibition - 2007, Palakkad, Kerala, India. September 26-28, 2007.
- 25 Anupama. P S, Sathees Kumar. K. V and Dr. Rominus Valsalam. "Computerized Filterbed Automation System for Water Treatment Plants ", flotek.g Global Conference and Exhibition - 2007, Palakkad, Kerala, India. September 26-28, 2007.
- 26 Dr. S. Rominus Valsalam, B. Raja Singh, G. Preetha. "System Identification and Process Modelling", National Conference on Automation Systems Technology, Thiruvananthapuram, India. May 2-3, 2008.
- 27 Dr. S. Rominus Valsalam, G. Preetha. "An Intelligent Colour Sensor based on Hybrid Neural Network", 3RD IEEE International Conference on Industrial and Information Systems", IIT Kharagpur, India. 8-10 December, 2008.
- 28 Dr. S. Rominus Valsalam, Anish Satyan and Shankar S.S , "Distributed SCADA System for Optimization of Power Generation", IEEE Conference on Control, Communication and Automation, IIT – Kanpur, December 11 – 13, 2008.
- 29 Abhirraj N Metkar, S. Rominus Valsalam and Sujimon K T, "An Intelligent SCADA system for efficiency enhancement of water treatment plants", 6th International Conference on Trends in Industrial Measurements and Automation (TIMA-2009), Chennai, January 4 - 6, 2009.
- 30 Dr. S. Rominus Valsalam, Anish S and B. Raja Singh, "Advanced Automation System for Hydro Electric Power Stations", 6th International Conference on Trends in Industrial Measurements and Automation (TIMA-2009), Chennai, January 4 – 6, 2009
- 31 Dr. S. Rominus Valsalam, Anish S and B. Raja Singh, " Boiler Modelling and Optimal Control of Steam Temperature in Power Plants", IFAC International Symposium on Power Plants and Power Systems Control, Finland, July 5 – 8, 2009.
- 32 Dr. S. Rominus Valsalam, Anish S and B. Raja Singh, " Boiler Modelling and Optimal Control of Steam Temperature in Power Plants", Science Direct, IFAC journal

- proceedings, Elsevier, Volume 42 , Issue 9, pp:125 - 130, 2009.
- 33 K. Sankar, T.K. Radhakrishnan and S. Rominus Valsalam, "Modelling, Simulation and Control of Boiler Power Plant", ChEmference'10, IIT Kanpur, India, July 13 – 14, 2010.
 - 34 Anupama P, K.V. Satheeskumar and S. Rominus Valsalam, "A Smart Colour Sensor based on Hybrid Neural Network", World Science Congress 2010 (WORLDCOMP/ICAI'10), Las Vegas, USA , July 15 – 17, 2010.
 - 35 Dr. S. Rominus Valsalam, Anish S and B. Raja Singh, "Optimal State Estimation and Prediction for Power Plant Control using Stochastic System Models", AMSE International Conference on Modelling and Simulation (MS'10 Barcelona), Spain, July 15-17, 2010. This paper is also accepted for publication in the World Scientific Book of Proceedings.
 - 36 V. Muralidharan, Prabir Purkayastha, Prof. Peter Fritzson, Dr. S. Rominus Valsalam, Prasad. R, Abhir Raj Metkar, Roshna C.P, "Hardware-in-the-loop Real Time Simulation with OpenModelica for Process Automation", 7th EUROSIM Congress on Modelling and Simulation (EUROSIM 2010), Prague, Czech Republic, September 6 – 10, 2010.
 - 37 S. Rominus Valsalam, " Coal Mill Modelling and Optimized Control", DST-RFBR sponsored Indo-Russian Workshop on High Performance Computing in Science and Technologies, Pune, India, November 17-19, 2010.
 - 38 Martin Luthur S.K, Raja Singh. B, Dr. S. Rominus Valsalam, Narayanan S and Radhakrishnan T.K, "Intelligent Parameter and State Estimation for coal mill in a Thermal Power Plant", International Conference on System Modelling, Optimization and Advanced Process Automation (SYMOPA-2010), pp:17-22, Thiruvananthapuram, December 18-19, 2010.
 - 39 K.Sankar, T.K. Radhakrishnan and S. Rominus Valsalam, "Modelling, Simulation and Control of Multivariable System : Boiler Power Generation Plant". International Conference on System Modelling, Optimization and Advanced Process Automation (SYMOPA-2010), pp :47-54, Thiruvananthapuram, December 18-19, 2010.
 - 40 K.V Satheeskumar, P.Anupama, V.Muralidharan and S. Rominus Valsalam, "Intelligent Colour Sensing System", International Conference on System Modelling, Optimization and Advanced Process Automation (SYMOPA-2010), pp:73-80 Thiruvananthapuram, December 18-19, 2010.
 - 41 Dr. S. Rominus Valsalam, "*Advances in Automation Systems Technology*", AICTE Sponsored Seminar on Automation Technology, St. Xavier's Catholic Engineering College, Nagercoil, Tamil Nadu, March 26, 2011.
 - 42 Akhil.T.Nair, Dr.T.K.Radhakrishnan, Dr.K.Srinivasan and Dr. S. Rominus Valsalam, "*Kalman filter based State Estimation of a Power Plant*", IEEE International Conference on Process Automation, Control and Computing, Coimbatore, July 20 – 22, 2011.
 - 43 Dr. S. Rominus Valsalam, Anish. S and B. Rajasingh, "*Boiler Modeling and Optimal Control of steam temperature in Thermal Power plants*", Journal of Energy and Power Engineering, USA, Volume 5, No.8, pp: 677-684, August 2011.
 - 44 Dr. S. Rominus Valsalam, "*Modern Computerised Automation Systems for Industrial Processes*", Seminar organized by IEEE Student Chapter, Barton Hill Engineering College, Thiruvananthapuram, August 20, 2011.
 - 45 Dr. S. Rominus Valsalam, B. Rajasingh and Akhil T.Nair, "*Pulverised coal flow measurement in Thermal Power Plant using Evolutionary Computation Technique*", Global Conference and Exhibition-2012, Fluid Control Research Institute, Palakkad, Kerala, January 18-12, 2012.
 - 46 Amod K. Hulge, Ajay Dangi, Syam Krishnan, Vamsi Krishna Guntapudi, Dr.S. Rominus Valsalam and Prof. Rudra Pratap , "*Development and fabrication of PZT based piezoelectric micromachined ultrasound transducers (pMUT) for in-air use applications*, 1st International Symposium on Physics and Technology of Sensors , Pune, March 8-10, 2012

47. Asha P.A, Anish S, S. Rominus Valsalam and Rudra Pratap, "Design and Development of Ultrasonic MEMS Level Sensing System for 3D measurement of Liquid-Solid Hybrid Surfaces", IEEE International Conference on Data Science & Engineering (ICDSE 2012), Cochin, Kerala, pp:149-154, July 18 - 20, 2012.
48. Anupama P, Harikrishnan. G, Indu. S, K.V Sathees Kumar, S. Rominus Valsalam and V. Muralidharan, "An Intelligent Reflective Colour Sensor System for Paper and Textile Industries", 14th International Conference on Artificial Intelligence (ICAI'12), USA, July 16-19, 2012.
49. Dr. S. Rominus Valsalam, B. Rajasingh and T.K Radhakrishnan " Real time Estimation of Pulverised Coal Flow in Thermal Power Plants using Coal Mill Models and Evolutionary Computation Algorithms" , Lourdes Journal of Computing and Infosystems, Thiruvananthapuram, November 2012.
50. Dr. Polaiiah Bojja, Dr. Rominus Valsalam, Abhir Metkar, "Evaluation and Self-Tuning of Robust Adaptive PID Controller & Fuzzy Logic Controller for Non-Linear System-Simulation Study", 7th MODPROD Workshop on Model-Based Product Development, Linköping University, Sweden, February 5-6, 2013.
51. Dr. S. Rominus Valsalam, "Cyber - Physical System Security Solutions for Industrial Control Systems in Power & Energy Sector", IEEE Workshop on SCADA Security, CDAC, Mumbai, October 19, 2013.
52. Dr. S. Rominus Valsalam, "SCADA Security Solutions for Industrial Control Systems", Workshop on Smart Grid- Perspectives in Cyber Security, Mumbai, January 13 – 17, 2014.
53. Dr. S. Rominus Valsalam, "Product Design and Development", National Seminar on SENSORS'14 - Sense, Control & Actuate, NIT Trichy, March 13 - 15, 2014.
54. Ajay Dangi, Amod Hulge, Anish Somasundaran, Rominus S. Valsalam and Rudra Pratap, "*Complete development of a single cell PMUT transducer: design, fabrication, characterization and integration*", Journal of Institute of Smart Structures and Systems (ISSS), 4(1), pp. 61-69, March-September 2015.
55. Rajasingh, S. Rominus Valsalam, H.Pratheesh, K.T. Sjimon and C.Aditi, "*Real time pulverized coal flow soft sensor for Thermal power plants using Evolutionary Computation Techniques*", Journal of Soft-Computing Theory, Applications & Implementations in Engineering & Technology, Volume 5, Issue 2, pp:911-916, January 2015.
56. Dr. S. Rominus Valsalam, "*Grand Challenges in Automation and Control*", PRABANDH National Conference, Mohandas College of Engineering & Technology, Thiruvananthapuram, July 31, 2015.
57. Dr. S. Rominus Valsalam, "*Changing Horizons of Automation & Control Technology*". Programme on Research Methods in Electronics and Instrumentation, Adi Shankara Institute of Engineering & Technology, Kalady, Kerala, September 4, 2015.
58. Dr. S. Rominus Valsalam, "*Resilient Cyber-Physical Systems for Automation & Control*", IEEE Symposium on Frontiers of Technology – Fuelling Prosperity of Plant and People, Mumbai, September 10 - 11, 2015.
59. Dr.S. Rominus Valsalam, "*Appropriate SCADA and Automation Technology for Realization of Smart Cities in India*", Proposal Enhancement Workshop on Smart City Mission - organized by the Ministry of Urban Development, New Delhi, November 21, 2015.
60. Dr. S. Rominus Valsalam, "*Applications of Sensors and Automation Technology for Urban Flood Control*", Winter School on Urban Flood Control, National Institute of Technology, Warrangal, December 9 – 11, 2015.
61. Dr. S. Rominus Valsalam, "Challenges in Automation & Control Technology", Workshop on Instrumentation, TKM College of Engineering, Quilon, November 11,

2016.

62. Dr. S. Rominus Valsalam and Pratheesh H, "Enhancement of Energy Efficiency in Cement Plants and Intelligent Process Optimization", International Seminar on POWER INDIA - Impacts of Climate Change and Imperatives for Rapid Transition, Energy Management Centre, Thiruvananthapuram, November 14 - 15, 2016.
63. Dr. S. Rominus Valsalam, "Optimal State Estimation & Prediction and Attack Resilient Automation System for Industrial Processes", 5th International Conference on Automation & Information Technology in Iron & Steel making: Vision 2025, ITISM'16, Ranchi, India, November 26 - 27, 2016.

B. PATENTS

1. The Controller of patents, Government of India has awarded us a patent on 11-10-2010, for our invention "A device for the measurement of Residual Chlorine used as a disinfectant in drinking water".
2. Submitted a patent application on 19-03-2008 for our invention "A Dynamic Chlorination System for the Distribution of Drinking Water"
3. Submitted a patent application on 19-09-2008 for our invention " A Chlorine Booster System for Drinking Water Distribution"
4. Submitted a patent application on 22-11-2010 for our invention "A sustainable Boiler Superheater Temperature Controller for Thermal Power Plants".
5. Submitted a patent application on 14-06-2011 for our invention "A Sustainable Combustion Control System using inferential measurement of pulverised coal flow for improved combustion efficiency and reduced emissions – a retrofit for Thermal Power Plants".
6. Filed patent application No. 2182/DEL/2014A on 01-08-2014 for our invention "A device for determining sucrose concentration in a solution and a method there of". The application was published on 05-02-2016.
7. The joint patent with C-MET, Thrissur on our invention "A wearable device made of thermal sensor and a system for detection of cancer in Human breast " was sent for prior art search on 30-10-2015. Instructions for filing patent application has been sent to KNS Partner Bengaluru on 1.8.2016.

C. International presentations

1. "Advantages of Open Modelica and Parallel Modelica modelling of Industrial Processes and Systems", MODPROD Workshop on Model based product development, Linkoping University, Sweden, February 4-6, 2013.
2. "Requirement of Complex System modelling in Thermal Power Plants and design of Real-Time Adaptive Predictive Controllers using Open Modelica", University of Milan, Italy, February 11-14, 2013.
3. "*Boiler Modelling and Optimal Control of Steam Temperature in Power Plants*", IFAC International Symposium on Power Plants and Power Systems Control, Finland, July 5 – 8, 2009.
4. "*State-of-the-art cutting edge technologies in Automation & control*", Hannover Messe

- 2008 International Fair, Germany, April 21-25, 2008.
5. *"Implementation of Energy Management System for an Integrated Steel Plant"*, IEEE Energy Management and Power Delivery Conference (EMPD '98), Singapore, March 3-5, 1998.
 6. *"Optimization of LD converter Steel making process using Fall Back Model"* KENT process control limited, Luton, U.K, September 12-16, 1988
 7. *"Development of Fall back Models from Metallurgical models of LD converter steel making process,"* KRUPPS, West Germany, October, 1988.

D. OTHER ACTIVITIES

Member, Management Board CDAC-Thiruvananthapuram
Chairman, Higher studies committee CDAC-Thiruvananthapuram
Member, Project Board SEG, CDAC-Thiruvananthapuram
Member, Board of Studies for Instrumentation & Control Engineering,
NIT Trichy
Member, Advisory Council of Applied Electronics and Instrumentation, Adi
Shankara Institute of Engineering & Technology, Kaladi, Kerala
Senior Member IEEE
Member IEEE Control System Society
Fellow Institution of Engineers
Ph.D Thesis evaluation and Viva – Voce Examiner (NIT-Trichy, Anna University-
Chennai, SRM University-Chennai, JNT University-Anantapur)
M. Tech Thesis Examiner (Kerala University)
Chief Guest - National / International Seminars & Conferences
Keynote Speaker - National / International conferences.
Session Chair - National/International Seminars
Member, Model based Product Development Committee (MODPROD),
Linkopping University, Sweden.
Member, Open modelica based power plant optimization system development,
University of Milan, Italy.
Member, HART Foundation - Field Comm Group
