

Curriculum Vitae

Manfred Morari

BORN 13 May 1951, Graz, Austria

EDUCATION AND ACADEMIC EXPERIENCE

1969-1970 American Field Service Scholarship
1970-1974 ETH Zurich, dipl. Chemieingenieur ETH
1975-1977 University of Minnesota, Minneapolis, Ph.D. in Chemical Engineering
University of Wisconsin, Madison
Department of Chemical Engineering
1977-1981 Assistant Professor
1981-1983 Associate Professor
California Institute of Technology, Pasadena
Chemical Engineering
1983-1991 Professor
1990-1993 Executive Officer for Chemical Engineering
1991-1994 Ross McCollum-William H. Corcoran Professor
1993-1994 Executive Officer for Control and Dynamical Systems
1994-2008 ETH Zurich
Department of Information Technology and Electrical Engineering
Professor and Head of Automatic Control Laboratory
2009-present Head of Department of Information Technology and Electrical Engineering

INDUSTRIAL EXPERIENCE

Summer 1978 Exxon Research and Engineering Company, Systems Division, Florham Park, NJ
Summer/Fall 1981 ICI Ltd., Northeast Regional Engineering Department, Control Division, Teesside, and Corporate Laboratory, Design Division, Runcorn, England
Consultant for various international companies

HONORS AND AWARDS

1979 Merck, Sharp & Dohme Lectures, University of Puerto Rico, Mayaguez
1980 Donald P. Eckman Award of the American Automatic Control Council
1981 Case Visiting Scholar, Case Western Reserve University, Cleveland, Ohio
1983 Robert W. Vaughan Lectureship in Chemical Engineering, California Institute of Technology
1984-1989 NSF–Presidential Young Investigator Award
1984 Allan P. Colburn Award of the AIChE for Excellence in Publications by a Young Member of the Institute
1984 John J. Karakash Visiting Professorship, Lehigh University
1987 Vogt Endowment Seminar on Computer Aided Engineering, University of

Louisville

1987 Harry and Martha Stern Guest Lecturer, Technion–Israel Institute of Technology

1987 Ernest W. Thiele Lectureship in Chemical Engineering, University of Notre Dame

1987 Gulf Visiting Professor of Chemical Engineering, Carnegie Mellon University

1989 Curtis W. McGraw Research Award, American Society for Engineering Education

1990 Ashton Cary Lectureship in the School of Chemical Engineering, Georgia Institute of Technology

1990 George S. Axelby Outstanding Paper Award, IEEE Transactions on Automatic Control

1993 National Academy of Engineering (U.S.)

1994 J. W. T. Spinks Lecturer, University of Saskatchewan

1995 Professional Progress Award of the AIChE for Outstanding Progress in Chemical Engineering

Stanley Katz Memorial Lecture, City College of the City University of New York

1997 George R. Brown School of Engineering’s Dean Distinguished Lecturer, Rice University

1997 Grosses Ehrenzeichen des Landes Steiermark, Steiermärkische Landesregierung

2002 Tustin Lecture of the IEE, London

2002 Computing in Chemical Engineering Award, CAST Division of the AIChE

2003 Paper Prize, Society of Instrument and Control Engineers (SICE), Japan

Doctor Honoris Causa, Babes-Bolyai University, Romania

2004 The Distinguished Lecture Series, the University of Utah

The Bayer Distinguished Research Lecture, Carnegie Mellon University

2005 2005 IEEE Control Systems Award (IEEE Technical Field Award)

Fellow of IEEE

2006 The Nordic Process Control Award, Technical University of Denmark (DTU) Lyngby

2007 MacKay Visiting Professor of Electrical Engineering and Computer Sciences, University of California, Berkeley

2007 Russell Severance Springer Visiting Professor of Mechanical Engineering, University of California, Berkeley

2007 John Ragazzini Award of the AACC (American Automatic Control Council)

2008 Fellow of IFAC (International Federation of Automatic Control)

2010 Hendrik W. Bode Lecture Prize 2010 of the IEEE Control Systems Society

2011 2011 Richard E. Bellman Control Heritage Award of the American Automatic Control Council

Fellow of the AIChE (American Institute of Chemical Engineers)

PUBLICATIONS

Books, Journals and Conferences: > 600

- Citations: ISIHighlyCited.com in Engineering, h-Number (ISI): 54
- ~ 14,000 ISI citations, ~ 25,000 Google Scholar citations

PLENARY/KEYNOTE LECTURES after 1990

1991	Fourth World Congress of Chemical Engineering, Karlsruhe, Germany
1991	American Control Conference, Boston, MA
1992	ESCAPE 2, European Symposium on Computer Applications in Process Engineering, Toulouse, France
1992	SIAM Conference on Control Theory and its Applications, Minneapolis, MN
1992	INTERKAMA Congress '92, First International Congress on Scientific and Strategic Aspects of Measurement and Automation, Düsseldorf, Germany
1992	"Interaction Between Process Design and Process Control" IFAC Workshop, London, U.K.
1993	ECC'93, Second European Control Conference, Groningen, Netherlands
1993	ESCAPE 3, European Symposium on Computer Applications in Process Engineering, Graz, Austria
1993	Workshop on Model Based Predictive Control, Oxford, England
1994	PSE'94, Fifth International Symposium in Process Systems Engineering, Kyongju, Korea
1995	'95 KACC, Korea Automatic Control Conference, Seoul, Korea
1997	Joint 6th International Symposium on Process Systems Engineering (PSE '97) and 30th European Symposium on Computer Aided Process Engineering (ESCAPE-7), Trondheim, Norway
	2nd IFAC Symposium on Robust Control Design, Budapest, Hungary
	Curso Internacional: Nuevas Tendencias en Sistemas y Control (New Trends in Systems and Control), Departamento de Ingeniería de Sistemas y Automática, Universidad de Sevilla, Sevilla, Spain
1998	IEEE Conference on Control Application (CCA'98), Trieste, Italy
	Hybrid Systems: Computation and Control, First International Workshop, HSCC'98, Berkeley, California, USA
	17th Benelux Meeting on Systems and Control, Mierlo, The Netherlands
2000	IASTED International Conference 2000 on Modelling, Identification, and Control, Innsbruck, Austria
	Process Control and Instrumentation 2000, The University of Strathclyde, Glasgow
	Workshop "Systems with time-domain constraints", Technische Universiteit, Eindhoven
	COBEQ, XIII Brazilian Congress of Chemical Engineering/XIX Interamerican Congress of Chemical Engineering/I Brazilian Congress of Phase Equilibrium and Fluid Properties for Chemical Process Design (I EQUIFASE.BR), Aguas de São Pedro, São Paulo, Brazil
	SAIChE 2000, 9th National Meeting, Secunda, Mpumalanga, South Africa, presented by the South African Institution of Chemical Engineers
2001	Conference on Chemical Process Control (CPC-6), Tucson, Arizona

- 25 Years of Nonlinear Control at École des Mines, le Centre Automatique et Systèmes de l'École des Mines, Paris
 Hybrid Systems: Computation and Control (HSCC) 2001, Fourth International Workshop, Rome
 ESCAPE-11 Denmark 2001, 34th European Symposium of the Working Party on Computer Aided Process Engineering, Scanticon Comwell Kolding, Denmark
 DYCOPS-6, 6th IFAC Symposium on Dynamics and Control of Process Systems, Chejudo Island, Korea
 Dutch Institute of Systems and Control (DISC), Summer School on the Impact of Optimization in Control, Mierlo, The Netherlands
 Control of Anesthesia, AIChE Annual Meeting, Reno, Nevada
 Roger W. Sargent's 75th Birthday Celebration, Imperial College of Science, Technology and Medicine, London
- 2002 Tustin Lecture, IEE, London
 Ninth Roger Sargent Lecture, Imperial College of Science Technology and Medicine, London
- 2003 11th Mediterranean Conference on Control and Automation (MED'03), Rhodes
 European Control Conference (ECC 03), Cambridge
 Slovenian Chemical Society Event (SCS), Maribor, Slovenia
- 2004 Workshop Hybrid Systems and Control, University of Utah, Salt Lake City
 FOCAPD 2004, University of Princeton, Princeton
 The Bayer Distinguished Research Lecture, Carnegie Mellon University, Pittsburgh
- 2005 IEEE International Symposium on Industrial Electronics (ISIE 2005), Dubrovnik
 16th IFAC World Congress, Prague
 Assessment and Future Directions of Nonlinear Model Predictive Control (NMPC), Freudenstadt-Lauterbach
- 2006 Conference on Chemical Process Control (CPC7), Lake Louise, Canada
 Nordic Process Control Award speech, 13th Nordic Process Control Workshop (NCPW), Lyngby, Denmark
 Dansk Automationselskab (DAu) Conference, Brøndby, Denmark
 New Trends in Automation and Industrial IT, Advanced Control Workshop, Västerås, Sweden
 International Society of Anaesthetic Pharmacology (ISAP) 15th Annual Meeting, Chicago
- 2007 Distinguished Lecture Series, University of Padova, Italy
 Kelly Lectures, Purdue University
 Distinguished Lecture Series in Computation for Design and Optimization (CDO), Massachusetts Institute of Technology (MIT), Cambridge, USA
 European Control Conference 2007 (ECC'07), Kos, Greece
 Simon Stevin Lecture Series on Optimization in Engineering, KU Leuven, Belgium
 Electrical & Computer Engineering (ECE) Distinguished Lecture Series, Carnegie Mellon University

2008	The 27th Chinese Control Conference (CCC'08), Kunming, China The Nokia Distinguished Lectures on Cyber-Physical Systems, University of California, Berkeley Symposium in Honor of Prof. Reuel Shinnar, City College of New York
2009	Workshop in celebration of David Clarke's contribution to MPC, University of Oxford Invited lecture, University of Belgrade 6 th IFAC Symposium on Robust Control Design (ROCOND'09), Haifa
2010	LCCC Workshop, Lund, Sweden 2nd IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys'10), Annecy, France ICCAS (International Conference on Control, Automation and Systems), Kintex, Korea The Hendrik W. Bode Lecture, 49 th IEEE Conference on Decision and Control (CDC), Atlanta
2011	ESCAPE21 (European Symposium on Computer-Aided Process Engineering), Chalkidiki, Greece Keynote, IEEE Multi-Conference on Systems and Control, Denver

PROFESSIONAL ACTIVITIES

1979-1989	Theory Committee of the American Automatic Control Council, AIChE representative
1980-1990	National Programming Committee, AIChE—CAST Division, Area 10A: Process and Systems Design
1981-1996	CACHE Corp. (Computer Aids in Chemical Engineering), elected trustee
1983-1998	The Butterworth Series on Chemical Engineering, Advisory Editor
1983-present	IFAC Applications Committee, Working Group on Chemical Process Control (Member)
1985	National Research Council, Committee to Survey Chemical Engineering, Panel for Computer-Assisted Process and Control Engineering, panelist
1985-1995, 2002-	Computers & Chemical Engineering, Member of Editorial Board
1995-2001	Computers & Chemical Engineering, Associate Editor
1987-1989	Industrial & Engineering Chemistry Research, Member of Editorial Advisory Board
1987-1989	Computing and Systems Technology (CAST) Division of AIChE, Director
1987-1992	IEEE Control System Society, Technical Committee on Industrial Systems, Working Group on Chemical Processing
1987-present	Latin America Applied Research, Member of International Advisory Board
1989-present	International Journal of Control, Member of Editorial Board
1989-1990	American Automatic Control Council, Bellman Control Heritage Award Subcommittee, chairman
1990, 1992	Carnegie Mellon University, Engineering Design Research Center, Technical Review Committee, chairman
1990-present	International Journal of Robust and Nonlinear Control, Member of Editorial

	Board
1990-1996	Cornell University, School of Chemical Engineering, Advisory Council Member
1990-1991	American Automatic Control Council, Donald P. Eckman Award Subcommittee, chairman
1992-1995	IEEE Transactions on Automatic Control, Associate Editor at Large
1992 - present	Fluid Networks, Member of Editorial Board
1992-1993	American Automatic Control Council, Awards Committee, chairman
1992-1995	University of Maryland, Systems Research Center, Research Advisory Council Member
1992-1997	AIChE, Awards Committee Member
1993-1996	Rice University, George R. Brown School of Engineering, Advisory Council Member
1993-2005	Oxford University Press series on Topics in Chemical Engineering, Associate Editor
1994-present	Mathematical Problems in Engineering: Problems, Theories and Applications, Member of Editorial Board
1994-present	Journal of Systems and Control Engineering (Part I, Proc. of the Institution of Mechanical Engineers), Corresponding Member
1995-2001	European Journal of Control, Associate Editor
1996-present	Automatica, Editor, Survey Papers
1997-present	Journal of Automatic Control, Member of Editorial Board
1999-present	Integrated Computer-Aided Engineering, Member of Editorial Advisory Board
2000-present	Optimization and Engineering, Associate Editor
2000-2003	U.S. National Academy of Engineering, Peer Committee for Chemical Engineering
2001-2002	Industrielle Automationstechnik, Technische Universität Wien, member of Berufungskommission
2006-2008	European Union Control Association (EUCA), Member of Administrative Council 2006-2008
2009-2010	Chair of the 2010 IEEE Control Systems Award Committee
2011-2013	European Union Control Association (EUCA), President 2011-2013

PATENTS

Title: Arrangement and process for controlling a numerical value for patient respiration
Inventors: R. Dittmann, S. Grünitz-Post, St. Leonhardt, A. Gentilini, A. Glattfelder, M. Morari, T. Schnider, A. Zbinden
Assignee: Draeger Medical AG (DE)
Priority date: 2000-03-25
Publication numbers: DE 10015026, US 2002014236, FR 2806633
Patents granted: DE 10015026 C2, US 6691705

Title: System for controlling hydroelectric power plants
Inventors: G. Glanzmann, M. von Siebenthal, T. Geyer, G. Papafotiou, M. Morari
Assignee: Eidgenössische Technische Hochschule Zürich (CH)
Priority date: 2004-08-27 (US 60/605,342)
Publication numbers: EP 1787172, WO 2006021125

Title: Method for operating a rotating electrical machine
Inventors: T. Geyer, G. Papafotiou, M. Morari
Assignee: ABB Research LTD (CH); Eidgenössische Technische Hochschule Zürich (CH)
Priority date: 2004-12-10
Publication numbers: EP 1670135, US 2006125435, JP 2006174697
Patents granted: US 7256561

Title: A system for controlling administration of anaesthesia
Inventors: T. Bouillon, A. Caruso, M. Luginbühl, M. Morari, P.M. Schumacher, E. Zanderigo
Assignee: Universität Bern (CH), ETH Zürich (CH)
Priority date: 2006-06-21 (EP 20060102702)
Publication number: WO 2007147505

BOOKS and BOOK CHAPTERS

M. Morari and I. E. Grossmann (eds.), CACHE Process Design Case Studies (6 volumes)

M. Morari and T. J. McAvoy (eds.), Chemical Process Control-CPC III. Proc. of the Third International Conference on Chemical Process Control, CACHE-Elsevier, Amsterdam, 1986 (932 pages)

D. M. Prett and M. Morari (eds.), Shell Process Control Workshop, Butterworth Publishers, Stoneham, 1987 (369 pages)

M. Morari and E. Zafiriou, Robust Process Control, Prentice Hall, Englewood Cliffs, 1989 (512 pages)

R. D. Colberg and M. Morari, Analysis and Synthesis of Resilient Heat Exchanger Networks. Advances in Chemical Engineering, 14, 1-95, Academic Press, San Diego, 1988

M. Morari and N. Lawrence Ricker, Model Predictive Control Toolbox, The MathWorks, Inc., Natick, MA, 1994

M. Morari and J. Morris (eds.), Int. J. Control, Special Issue: Advances in Process Control, 59(3), 1994

M. Morari, L. Thiele (eds.), Hybrid systems: Computation and control, LNCS, Proceedings of the 8th International Workshop, HSCC 2005, Zurich, Switzerland, March 2005, vol. 3414, 2005 (684 pages)

A. Sahin, M. Morari, Decentralized Model Predictive Control for a Cascade of River Power Plants, Intelligent Systems, Control and Automation: Science and Engineering, vol. 42, pp. 463 - 486

ARTICLES

1975

- L.M. Rose, M. Morari, P. J.Schwyn, F. W. Evans, A Simulation Approach for the Design of Multicomponent Batch Distillation, Proc. of the Symposium, Computers in the Design and Erection of Chemical Plants, Karlovy Vary, Czechoslovakia, pp. 117-126, 1975

1976

- M. Morari, G. Stephanopoulos and R. Aris. Finite Stability Regions for Large-Scale Systems with Stable and Unstable Subsystems, Int. J. Control, 26, pp. 805-815, 1977; also presented at the Annual AIChE Meeting, Chicago, 1976

1977

- M. Morari, G. Stephanopoulos, A Static Estimator for Use in Process Control, Proc. of the Joint Autom. Contr. Conf., San Francisco, pp. 1537-1542, 1977
- G. Stephanopoulos, M. Morari, Synthesis of Control Structures for Chemical Processes, Invited review paper, Proc. of the 5th Symposium, Computers in Chemical Engineering, Vysoke Tatry, Czechoslovakia, pp. 735-758, 1977

1978

- M. Morari, Y. Arkun, G. Stephanopoulos, An Integrated Approach to the Synthesis of Process Control Structures, Proc. of the Joint Autom. Contr. Conf., Philadelphia, pp. 243-253, 1978
- M. Morari, G. Stephanopoulos, Comments on Finding the Generic Rank of a Structural Matrix, IEEE Trans. Autom. Contr. (Technical Notes and Correspondence), AC-23, pp. 509-510, 1978

1979

- D.C. Faith, M. Morari, Synthesis of Distillation Schemes with Energy Integration, Proc. of the 12th Symp. on Computer Appl. in Chem. Eng., Europ. Federation of Chem. Eng., Montreux, Switzerland, pp. 501-511, 1979; also Comp. & Chem. Eng., 3, pp. 269-272, 1979
- M. Morari, A. Fung, A Probabilistic Approach to Nonlinear Inferential Control. Proc. of the Joint Autom. Contr. Conf., Denver, CO, pp. 289-294, 1979
- M. Morari, W. H. Ray, The Integration of Real-Time Computing into Process Control Teaching at Wisconsin—Part I: The Graduate Course, Chem. Eng. Educ., 13, pp. 160-162, 1979
- M. Morari, G. Stephanopoulos, R. Aris, Stability Analysis of Structured Chemical Engineering Systems via Decomposition, Chem. Eng. Sci., pp. 34, 11-15 1979
- G. Stephanopoulos, Y. Arkun, M. Morari, A Unified Approach to the Synthesis of Control Structures for Complex Chemical Plants, Proc. of the 12th Symp. on Computer Appl. in Chem. Eng., Europ. Federation of Chem. Eng., Montreux, Switzerland, pp. 1139-1155, 1979

1980

- C.E. Garcia, M. Morari, Optimal Operation of Integrated Processing Systems, Part I: Open Loop On-Line Optimizing Control, AIChE J., 27, pp. 960-968, 1981, also Proc. of the Joint Autom. Contr. Conf., San Francisco, 1980
- A.M. Lenhoff, M. Morari, Design of Resilient Processing Plants. I. Process Design Under Consideration of Dynamic Aspects, Chem. Eng. Sci., 37, pp. 245-258, 1982, also Proc. of the Joint Autom. Contr. Conf., San Francisco, 1980
- D.F. Marselle, M. Morari, D.F. Rudd, Design of Resilient Processing Plants, II, Design and Con-

trol of Energy Management Systems, Chem. Eng. Sci., 37, pp. 259-270, 1982, also presented at the Annual AIChE Mtg., Chicago, IL 1980

- M. Morari, On the Stability of Model Reference Adaptive Control Systems, Ind. Eng. Chem. Process Des. & Dev., 19, pp. 279-281, 1980
- M. Morari, Some Comments on the Optimal Operation of Batch Crystallizers. Chem. Eng. Comm., 4, pp. 167-171, 1980
- M. Morari, Y. Arkun, G. Stephanopoulos, Studies in the Synthesis of Control Structures for Chemical Processes; Part I: Formulation of the Problem. Process Decomposition and the Classification of the Control Tasks. Analysis of the Optimizing Control Structures. AIChE J., 26, pp. 220-232, 1980
- M. Morari, C.D. Faith, The Synthesis of Distillation Trains with Heat Integration, AIChE J., 26, pp. 916-928, 1980
- M. Morari, J. O'Dowd, Optimal Sensor Location in the Presence of Nonstationary Noise, Automatica, 16, pp. 463-480, 1980
- M. Morari, W.H. Ray, The Integration of Real-Time Computing into Process Control Teaching at Wisconsin—Part II: The Undergraduate Course, Chem. Eng. Educ., 14, pp. 32-26, 1980
- M. Morari, G. Stephanopoulos, Minimizing Unobservability in Inferential Control Schemes, Int. J. Control, 31, pp. 367-377, 1980
- M. Morari, G. Stephanopoulos, Studies in the Synthesis of Control Structures for Chemical Processes; Part II: Structural Aspects and the Synthesis of Alternative Feasible Control Schemes, AIChE J., 26, pp. 232-246, 1980
- M. Morari, G. Stephanopoulos, Studies in the Synthesis of Control Structures for Chemical Processes; Part III: Optimal Selection of Secondary Measurements Within the Framework of State Estimation in the Presence of Persistent Unknown Disturbances, AIChE J., 26, pp. 247-260, 1980
- G. Stephanopoulos, Y. Arkun, M. Morari, Design of Optimizing Control Structures for Chemical Plants, ACS Symposium Series, No. 124, Computer Applications to Chemical Engineering, pp. 207-216, 1980

1981

- C.E. Garcia, M. Morari, Internal Model Control 1, A Unifying Review and Some New Results, Ind. Eng. Chem. Process Des. & Dev., 21, pp. 308-323, 1982, also presented at Annual AIChE Mtg., New Orleans, LA, 1981
- M. Morari, B. Holt, S. Lehmann, A Frequency Domain Approach to Control Structure Synthesis, Proc. of the IEEE Conf. on Decision and Control, San Diego, CA, pp. 478-482, 1981

1982

- M. Morari, Integrated Plant Control, A Solution at Hand or a Research Topic for the Next Decade? (Invited review paper), Chemical Process Control—II, Proc. of the Eng. Found. Conf. (T. F. Edgar, D. E. Seborg, eds.), United Engineering Trustees, pp. 467-496, 1982
- M. Morari, Operability Measures for Process Design, I. Chem. E. Symposium Series, No. 74, Understanding Process Integration, The Institution of Chemical Engineers, pp. 131-140, 1982
- M. Morari, A. K. W. Fung, Nonlinear Inferential Control, Comp. & Chem. Eng., 6, pp. 271-281, 1982

- M. Shahrokh, M. Morari, A Discrete Adaptive Observer and Identifier with Arbitrarily Fast Rate of Convergence, *IEEE Trans. Autom. Contr.*, AC-27, pp. 506-509, 1982
- M. Shahrokh, M. Morari, Using an Adaptive Observer to Design Pole-Placement Controllers for Discrete Time Systems, *Int. J. Control*, 36, pp. 695-710, 1982

1983

- M. Morari, Flexibility and Resiliency of Process Systems (Invited keynote address), *Proc. of the International Symposium of Process Systems Engineering, Kyoto*, pp. 223-238, 1982), also *Comp. & Chem. Eng.*, 7, pp. 423-437, 1983
- M. Morari, Design of Resilient Processing Plants–III, A General framework for the assessment of dynamic resilience, *Chem. Eng. Sci.*, 38, pp. 1881-1891, 1983
- M. Morari, Robust Stability of Systems with Integral Control. *IEEE Trans. Autom. Control*, AC-30, pp. 574-577, 1985, also *Proc. of the IEEE Conf. on Decision and Control*, San Antonio, TX, 865-869, 1983
- M. Morari, Internal Model Control–Theory and Applications (Invited keynote address), *Proc. of PRP Automation 5, 5th International IFAC/IMEKO Conference on Instrumentation and Automation in the Paper, Rubber, Plastics and Polymerization Industries*, Antwerp, Belgium, pp. 1-18, 1983
- B.A. Ogunnaike, J. P. Lemaire, M. Morari, W. H. Ray, Advanced Multivariable Control of a Pilot Plant Distillation Column, *AIChE J.*, 29, pp. 632-640, 1983

1984

- C.E. Garcia, M. Morari, Optimal Operation of Integrated Processing Systems, Part II: Closed-Loop On-Line Optimizing Control, *AIChE J.*, 30, pp. 226-234, 1984
- P. Grosdidier, M. Morari, B. R. Holt, Closed Loop Properties from Steady State Gain Information, *Ind. Eng. Chem. Fundam.*, 24, pp. 221-235, 1985, also *Proc. of American Control Conf.*, San Diego, 1290-1295, 1984
- I.E. Grossmann, M. Morari. Operability, Resiliency and Flexibility in Process Design-Objectives for a Changing World (Invited review paper), *Proc. of the 2nd Conf. on Foundations of Computer Aided Process Design*, Snowmass, CO, CACHE Corp., pp. 931-1010, 1984
- M. Morari, Foundations of Computer-Aided Chemical Process Design (Book review), *Chem. Eng. J.*, pp. 28, 67, 1984
- M. Morari, S. Skogestad, D.E. Rivera, Implications of Internal Model Control for PID Controllers, *Proc. of American Control Conf.*, San Diego, CA, pp. 661-666, 1984
- Saboo, M. Morari, Design of Resilient Processing Plants–IV, Some New Results on Heat Exchanger Network Synthesis, *Chem. Eng. Sci.*, 39, pp. 579-592, 1984
- W.E. Stewart, K. Levien, M. Morari, Collocation Methods in Distillation, *Proc. of 2nd Conf. on Foundations of Computer Aided Process Design*, Snowmass, CO, CACHE Corp., pp. 535-570, 1984

1985

- C.G. Economou, M. Morari, A New Theory for Nonlinear Controller Design. *Proc. of the 7th IFAC/IFIP/IMACS Conference on Digital Computer Applications to Process Control*, Vienna, Austria, 1985
- C.G. Economou, M. Morari, Newton Control Laws for Nonlinear Controller Design, *IEEE Conf.*

on Decision and Control, Fort Lauderdale, FL, pp. 1361-1366, 1985

- C.E. Garcia, M. Morari, Internal Model Control 2, Design Procedure for Multivariable Systems, Ind. Eng. Chem. Process Des. & Dev., 24, pp. 472-484, 1985
- C.E. Garcia, M. Morari, Internal Model Control 3, Multivariable Control Law Computation and Tuning Guidelines, Ind. Eng. Chem. Process Des. & Dev., 24, pp. 484-494, 1985
- B.R. Holt, M. Morari, Design of Resilient Processing Plants–VI, The Effect of Right-Half-Plane Zeros on Dynamic Resilience, Chem. Eng. Sci., 40, pp. 59-74, 1985
- Holt B. R., M. Morari. Design of Resilient Processing Plants–V. The Effect of Deadtime on Dynamic Resilience. Chem Eng. Sci., 40, pp. 1229-1237, 1985
- K.L. Levien, M. Morari, Internal Model Control of Coupled Distillation Columns, Proc. of the American Control Conf., Boston, pp. 1066-1071, 1985
- M. Morari, Feedback Control: Theory and Design (Book Review), AIChE J., 31, p. 703, 1985
- M. Morari, W. Grimm, M.J. Ogelsby, I.D. Prosser, Design of Resilient Processing Plants–VII, Design of Energy Management System for Unstable Reactors–New Insights, Chem. Eng. Sci., pp. 40, 187-198, 1985
- M. Morari, S. Skogestad, Effect of Model Uncertainty on Dynamic Resilience. PSE '85, I. Chem. E. Symposium Series, No. 92, The Institution of Chemical Engineers, pp. 493-505, 1985
- D.E. Rivera, M. Morari, Internal Model Control Perspectives on Model Reduction, Proc. Of the American Control Conf., Boston, pp. 1293-1298, 1985
- A.K. Saboo, M. Morari, D.C. Woodcock, Design of Resilient Processing Plants–VIII, A Resilience Index for Heat Exchanger Networks, Chem. Eng. Sci., 40, pp. 1553-1565, 1985
- K. Shimizu, B.R. Holt, M. Morari, R.S.H. Mah, An Assessment of Control Structures for Binary SRV Distillation Columns, Ind. Eng. Chem. Proc. Des. & Dev., 24, pp. 852-858, 1985
- S. Skogestad S., M. Morari, Design of Resilient Processing Systems–IX, Effect of Model Uncertainty on Dynamic Resilience. Chem. Eng. Sci., 42, pp. 1765-1780, 1987, also presented at Annual AIChE Mtg., Chicago, IL, 1985
- W.E. Stewart, K. L. Levien, M. Morari, Simulation of Fractionation by Orthogonal Collocation, Chem. Eng. Sci., 40, pp. 409-421, 1985
- E. Zafiriou, M. Morari, Digital Controllers for SISO Systems, A Review and a New Algorithm, Int. J. Control, 42, pp. 855-876, 1985

1986

- Y. Arkun, J. Hollett, W. M. Canney, M. Morari, Experimental Study of Internal Model Control. Ind. Eng. Chem. Proc. Des. & Dev., 25, pp. 102-108, 1986
- P.J Campo, M. Morari. Norm Formulation of Model Predictive Control Problems, Proc. of the American Control Conf., Seattle, WA, pp. 339-343, 1986
- C.G. Economou, M. Morari, B. Palsson, Internal Model Control 5: Extension to Nonlinear Systems, Ind. Eng. Chem. Proc. Des. & Dev., 25, pp. 403-411, 1986
- C.G. Economou, M. Morari, Internal Model Control 6: Multiloop Design. Ind. Eng. Chem. Process Des. & Dev., 25, pp. 411-419, 1986
- P. Grosdidier, M. Morari, Analysis of Interactions Using Structured Singular Values, Proc. of the American Control Conf., Seattle, WA, pp. 658-663, 1986

- P. Grosdidier, M. Morari, Interaction Measures for Systems Under Decentralized Control, *Automatica*, 22, pp. 309-319, 1986
- D.L. Laughlin, K. G. Jordan, M. Morari, Internal Model Control and Process Uncertainty: Mapping Uncertainty Regions for SISO Controller Design, *Int. J. Control*, 44, pp. 1675-1698, 1986
- J.A. Mandler, M. Morari, J. H. Seinfeld, Robust Controller Design for a Fixed-Bed Methanation Reactor, *Proc. of the American Control Conf.*, Seattle, WA, pp. 1387-1392, 1986
- J.A. Mandler, M. Morari, J. H. Seinfeld, Robust Multivariable Control System Design for a Fixed-Bed Reactor, *Ind. Eng. Chem. Fund.*, 25, pp. 645-655, 1986
- D. Marques, M. Morari, Model Predictive Control of Gas Pipeline Networks. *Proc. of the American Control Conf.*, Seattle, WA, PP. 349-354, 1986
- J. Mandler, M. Morari, J.H. Seinfeld, Control System Design for a Fixed-Bed Methanation Reactor, *Chem. Eng. Sci.*, 41, pp. 1577-1597, 1986
- M. Morari, Chemical Process Control-CPC III, International Conference on Chemical Process Control, Amsterdam, The Netherlands, pp. 932, 1986
- M. Morari, J.C. Doyle, A Unifying Framework for Control System Design Under Uncertainty and its Implications for Chemical Process Control in Chemical Process Control-CPC III (M. Morari and T. J. McAvoy (eds.), CACHE-Elsevier, Amsterdam, pp. 5-52, 1986
- D.E. Rivera, S. Skogestad, M. Morari, Internal Model Control, PID Controller Design, *Ind. Eng. Chem. Proc. Des. & Dev.*, 25, pp. 252-265, 1986
- A.K. Saboo, M. Morari, R. D. Colberg, RESHEX—An Interactive Software Package for the Synthesis and Analysis of Resilient Heat Exchanger Networks, Part I: Program Description and Application, *Comp. & Chem. Eng.*, 10, pp. 577-589, 1986
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