CURRICULUM VITAE

MARIO A. ROTEA

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I. PERSONAL

A. Education

- Ph.D. in Control Science and Dynamical Systems, University of Minnesota, Minneapolis, June 1990.
- M.S.E.E. in Electrical Engineering, University of Minnesota, Minneapolis, May 1988.
- Electronic Engineer Degree, Universidad Nacional de Rosario, Rosario, Argentina, March 1983.

B. Major positions

- Professor and Head, Mechanical and Industrial Engineering, University of Massachusetts – Amherst, April 2007 – present.
- Adjunct Professor, Electrical and Computer Engineering, University of Massachusetts – Amherst, April 2007 – present.
- Professor of Aeronautics and Astronautics, Purdue University, West Lafayette, August 2002—July 2007. Adjunct Professor since August 2007.
- Professor of Mechanical Engineering (by courtesy), Purdue University, West Lafayette, August 2006—July 2007.
- Program Director, Control Systems, Directorate of Engineering, National Science Foundation, January 2005—January 2007.
- Associate Professor, School of Aeronautics and Astronautics, Purdue University, West Lafayette, August 1995—July 2002.
- Senior Research Engineer, Mechatronics Department, United Technologies Research Center, East Hartford, August 1997—August 1998.
- Assistant Professor, School of Aeronautics and Astronautics, Purdue University, West Lafayette, August 1990—July 1995.
- Research Associate, Institute of Technological Development for the Chemical Industry, Santa Fe, Argentina, April 1984—August 1986.
- Assistant Engineer, Military Ammunition Factory Fray Luis Beltran, Rosario, Argentina, November 1983—March 1984.

C. Honors and awards

- *Plenary speaker* at the 2007 IEEE International Conference on Mechatronics and Automation (ICMA), Harbin, China, August 5-8, 2007.
- *Fellow*, Institute for Electrical and Electronic Engineers (IEEE), for contributions to robust and optimal control of multivariable systems, 2007.
- *CT Sun Excellence in Research Award*, School of Aeronautics and Astronautics, Purdue University, 2006.

- *Seed for Success Award Winner*, periods April—June 2004 and April—June 2005, for attracting research grants in excess of $1M to Purdue University.
- *Plenary speaker* at the IX Reunión de Trabajo en Procesamiento de la Información y Control, Santa Fe, Argentina, 2001.
- *Best Poster Interactive Paper Award* (out of 63 interactive posters), 42nd IEEE Conference on Decision and Control, Maui, HI, December 2003.
- *Top Five Undergraduate Teachers* in Aeronautics and Astronautics for the years 1995, 1996, 1997, 1998, and 2000.
- *Best Paper Presentation Awards*, American Control Conference, 1989, 1991, 1999, and 2001.
- *Young Investigator Award*, National Science Foundation, 1993.
- *Doctoral Dissertation Fellowship*, University of Minnesota, 1989.
- *Best GPA* (out of 137 graduates in Electronic, Electrical, Civil Mechanical Engineering; Mathematics; Physics), Universidad Nacional de Rosario.

D. Membership in academic, professional, and scholarly societies

- Fellow, Institute for Electrical and Electronic Engineers (IEEE).
- Member (elected), Board of Governors of the IEEE Control Systems Society, January 2007—December 2009.[1]
- Member, American Society of Mechanical Engineers (ASME).

[1] The IEEE Control Systems Society (http://www.ieeecss.org/) was founded in l954 as a scientific, engineering and professional organization dedicated to the advancement of the theory and practice of systems and control in engineering. Today, the Society has more than 10,000 members around the world. The society publishes three journals: the IEEE Control Systems Magazine, the IEEE Transactions on Automatic Control, and the IEEE Transactions on Control Systems Technology.

II. ENGINEERING EDUCATION

A. Courses taught

Purdue University

- AAE 421L and AAE 364L: Control Systems Laboratory (required).
- AAE 464 and AAE 364: Control Systems Analysis (required).
- AAE 490E: Introduction to Satellite Systems (senior elective).
- AAE 490R: Control System Design (senior elective).
- AAE 574: Digital Flight Control Systems (senior elective, graduate)
- AAE 696: Theory and Practice of Multivariable Control (graduate only).
- AAE 590R: Model Predictive Control (senior elective, graduate).

B. Statement of contributions to curriculum development

Professor Rotea has created several new courses to satisfy the research and educational needs of graduate and undergraduate students in the School of Aeronautics and Astronautics and the College of Engineering at Purdue University. He was also responsible for the content renovation of the undergraduate laboratory in dynamics and control within the School. A brief description of these efforts is given subsequently.

Control Systems Lab (AAE 364L)

In the mid 90's, Prof. Rotea redesigned the required undergraduate laboratory in dynamics and controls in the School of Aeronautics and Astronautics. He introduced a practical and rigorous iterative process for control system design that combines principled-based modeling, parameter estimation, and model-based control law design. Professor Rotea has introduced new experiments that enhance student awareness of control systems by providing hands on experience with systems representative of air and space vehicles. To support the lectures and laboratory sessions, he wrote the *364L Laboratory Manual*, which is a 137-page manual that describes basic theory, design procedures, and experiments. This manual has been used every semester since its completion in 1997.

Introduction to Satellite Systems (AAE 490E)

Under the umbrella of the Purdue Center for Satellite Engineering, Professor Rotea worked with six members of the center to introduce a new course in satellite systems. This course was developed in direct response to student interest and industry needs. Industry trends and the major subsystems of a satellite system are presented in the course. Specific topics included space environment, propulsion system, power system, structural design, spacecraft dynamics, orbit mechanics, thermal control, communications, and ground segments. These topics were integrated so that the students could appreciate how design choices in one subsystem may affect the behavior of other subsystems. Professor Rotea and his collabora-

tors have developed the 239-page course pack *Satellite Systems* containing lectures and homework assignments.

Control Systems Design (AAE 490R)

Professor Rotea has introduced an undergraduate senior elective course in control systems design. The main topics covered in this course were the design of control systems using frequency response methods and an introduction to the real-time digital implementation of controllers.

Theory and Practice of Multivariable Control (AAE696)

This course was introduced by Prof. Rotea to provide graduate students with advanced theory, methods, and software tools, for the analysis and design of model-based control systems that perform despite modeling errors (robust control systems). In this course, students learn (1) fundamental results in robust and optimal control theory, (2) state-of-the-art methodologies for the design of multivariable control laws, and (3) tricks-of-the-trade used to turn candidate designs into actual control laws. Students from the Schools of Aeronautics and Astronautics, Electrical Engineering, Mechanical Engineering, and Chemical Engineering have registered for this course.

Model Predictive Control (AAE590R)

Model predictive control (MPC) is a generic name used to describe control algorithms that map sensor signals into actuator commands by solving constrained optimization problems in real-time. This model-based technique has been mostly applied in the process control industry and is becoming increasingly popular in other areas (e.g., motion control, power systems, engines, vehicles and vehicle formations, communication networks, etc). In fall 2003, Prof. Rotea introduced this course to give students the necessary background to further develop and apply MPC.

C. Graduate students

Professor Rotea has supervised, or co-supervised, the completion of 13 Ph.D. and M.S. thesis, which have produced 15 archival journal publications. Further details are given in tables 1 and 2, including journal publications with these students and thesis in progress. He has also mentored other graduate students with whom he has published journal and conference publications; see table 3.

Professor Rotea has actively recruited the very best graduate students from top universities in Latin America. Some of these students are already occupying important leadership positions in the US industry and, as Hispanics, are contributing to the diversity of our technical workforce.

Table 1: Ph.D. Dissertations [2]

Name	Title	Date	Journal
Swei, S.	Quadratic stabilization of uncertain systems: reduced gain controllers, order reduction, and quadratic controllability (Co-supervised with M. Corless.)	May 1993	B.13 B.15 B.32
Prasanth, R.	Multiobjective H_∞ control	May 1996	B.18 B.23
Viassolo, D.	Design and implementation of periodic digital controllers	May 2000	B.29
D'Amato, F.	Algorithms for the maximization of linear fractional transformations	May 2001	B.31 B.34
Li, Y	Active and adaptive-passive control of acoustic impedance with thermoacoustic cooling applications. (Co-supervised with G. Chiu and L. Mongeau.)	May 2004	B.35
Lana, C.	Constrained state estimation and control	May 2008	B.38
Saheba, R.	Prognostics and diagnostics of electric machines (University of Massachusetts Amherst)	May 2009	

Table 2: M.S. Thesis [2]

Name	Title	Date	Journal
Eudaric, A.	Ellipsoid methods for multiobjective control with quadratic performance measures	May 1992	none
Viassolo, D.	Implementation of digital controllers	August 1996	none
D'Amato, F.	Control of lightly damped systems	May 1997	B.28
Kothandaraman, G	Parameter estimation of an airdrop system	December 2002	B.36
Lana, C.	Characterization of color printers using robust parameter estimation	December 2003	B.33
Lovera, J.	Algorithms for aircraft intent inference and trajectory prediction. (Co-supervised with I. Hwang.)	December 2005	B.37
Saheba, R.	Real-time thermal observer for electric machines (Purdue's nominee in the in the Midwestern Association of Graduate Schools Distinguished Thesis Award competition)	August 2006	A.1

Table 3: Publications with other graduate students

Name	Journal	Conference
Dong, D.	B.12	E.6
Zhu, G.	B.19	D.13
Song, G.		D.20
Lu, J.		D.22

[2] At Purdue University unless stated otherwise.

D. Undergraduate teaching rankings

Purdue University

- Ranked 5th for the 2000 Gustafson undergraduate teaching award.
- Ranked 3rd for the 1997 and 1998 Bruhn undergraduate teaching awards.
- Ranked 4th for the 1996 Bruhn undergraduate teaching award.
- Ranked 3rd for the 1995 Murphy undergraduate teaching award.

E. Short courses

- Robust Multivariable Control, 10-hour lecture course, Process & Systems Engineering Doctoral Program, University of Valladolid, Valladolid, Spain, September 2002.
- Real-Time Optimization by Extremum Seeking Control, eight-hour lecture course, American Control Conference, June 7, 2005, Portland, OR. Co-taught with M. Krstic (UCSD), K. Ariyur (Honeywell), A. Banaszuk (UTRC), and E. Schuster (Lehigh).
- Real-Time Optimization by Extremum Seeking Control, eight-hour lecture course, American Control Conference, June 13, 2006, Minneapolis, MN. Co-taught with M. Krstic, K. Ariyur, A. Banaszuk, and E. Schuster.

F. Workshops

- "The 5X-ME Workshop: Transforming Mechanical Engineering Education and Research in the USA," May 10-11, Arlington, VA. Invited participant to the NSF-sponsored workshop The goal of the workshop was to lay the foundation for transformative change in mechanical engineering education and research in the USA.[3] Professor Rotea was also an invited panelist at the follow-up plenary session at the International Mechanical Engineering Education Conference, April 4-8, 2008, Galveston, TX.
- "Chairing the Academic Department," November 5-8, 2008, TX. Participant.

[3] Further details may be found online at http://www-personal.umich.edu/%7Eulsoy/5XME.htm

III. RESEARCH & TECHNOLOGY TRANSFER

A. Statement of contributions

Professor's Rotea research lies in optimization and control of dynamical systems, with broad applicability to electrical, mechanical, and aerospace systems. In collaboration with engineers, scientists, and students, he has contributed theory and algorithms for performance analysis, state and parameter estimation, and robust and optimal control. He has also conducted interdisciplinary research in the application of active control and optimization technologies to problems in mechanical and aerospace systems. These contributions have been documented in more than 40 journal publications and book chapters, 70 conference publications, and several reports to industry and government agencies. This work has inspired many engineers and scientists, who have cited his contributions 1000 times in their own scholarly publications.[4] Selected contributions, illustrating the depth and breath of his work, are described subsequently.

H_∞ control

Professor Rotea early work in the H_∞ optimal control problem (journal paper B.2) is one of the pioneer contributions that led to an elegant and practical state-space characterization of solutions, which now is widely available in commercial software packages for control systems design (e.g., Mu-Analysis and Synthesis Toolbox, Robust Control Toolbox). This work was extended to the design of state-feedback controllers with simultaneous performance and robustness specifications (journal paper B.6).

A convex programming approach to estimation and control

In the early 90's, Professor Rotea introduced an innovative and rigorous method for control systems design with simultaneous robustness and performance specifications, which is based on finite-dimensional convex optimization (journal paper B.7, book chapter C.4). This was the first result showing that such control problem can be solved via convex programming, eliminating the need for attempting solutions to complicated nonlinear equations in order to calculate controllers.

Working with colleagues, students, and postdoctoral associates, Prof. Rotea discovered convex programming characterizations to several other important control and estimation problems. A partial list of results is as follows:

- Estimation and control with multiple specifications (journal papers B.10, B.11, B.17, B.18, B.19, B.20, B.23, B.27).
- Digital implementation of filtering and control algorithms (journal papers B.14, B.29).
- Analysis and control of nonlinear systems (journal papers B.24, B.31, B.39).

[4] The Science Citation Index Expanded, www.webofscience.com. h-index = 15.

Many of these results have inspired the so-called linear matrix inequality approach in systems and control[5], which has been widely adopted by control theoreticians and engineers.

Design of control systems for civil, mechanical, and aerospace systems

Professor Rotea has developed a methodology for the design of robust controllers that attenuate the impact of environmental disturbances in civil engineering structures. The methodology (journal paper B.28) accounts for minimal structural response to external disturbances, robustness to modeling errors, and constraints on the controller complexity.

Professor Rotea has been very active in the development and transition of advanced methods for control systems analysis and design to industry. Key contributions have been made in collaboration with engineers and scientists from United Technologies, a corporation that he consulted for extensively and joined as senior research engineer. Advanced methods for analysis and design were developed and tested in several applications, including flutter control in compression systems, chatter suppression in machine tools, and stability augmentation of helicopter rotors. His work in flutter control was instrumental for the development of practical solutions to control fan and compressor blade flutter in gas turbine engines[6]. His work in helicopter rotors has been characterized as innovative, and offering a unique approach, for the robust mitigation of aeromechanical instabilities in helicopters such as the RAH-66 Comanche[7]. He also developed a data-driven method for optimal sizing of actuators that led to a weight reduction of the actuators proposed in the Sikorsky noise control program. Except for journal paper B.30, the work in association with UT remains unpublished in the open literature.

Vibration analysis and optimization via structured semidefinite programming

Professor Rotea has developed a new method for the analysis of vibration amplitudes in the bladed disks of gas turbine engines. This method is capable of calculating the worst-case blade response more than 100 times faster than other competing approaches. At the heart of the method is a carefully crafted algorithm that calculates a tight bound on the worst-case blade response by solving a special convex optimization problem known as semidefinite program. The method has been documented in the journal article B.34 (see also conference publications D.33, E.21). The method, software, and related tools have been transferred to industry (workshops H.10, H.11, and manuals G.1, G.2). The method in B.34 has

[5] Boyd S., L. El Ghaoui, E. Feron, V. Balakrishnan, Linear Matrix Inequalities in System and Control Theory, SIAM Studies in Applied Mathematics, Vol. 15, SIAM: Philadelphia, 1994. This book cites 16 papers where Prof. Rotea is author or co-author.

[6] Banaszuk, A.; G. Rey; D. Gysling**,** "Active control of flutter in turbomachinery using off blade actuators sensors. Part II: Control algorithm," Proc. of the 41st IEEE Conference on Decision and Control, Vol. 4, pp. 3704 – 3709, 2002.

[7] Sahasrabudhe, Vineet, Gold, Phillip, "Reduced Rotor Body Coupling Using Active Control," Proc. of the 60th Annual Forum of the AHS, Baltimore, MD, 2004.

been recognized by industry as the only analytical method that can calculate worst-case response of a realistic bladed disk.[8]

Modeling and identification

Professor Rotea has been active in the development of methods for parameter estimation in various engineering applications. Working with colleagues from the Naval Postgraduate School, and the U.S. Army Yuma Proving Ground, a method to estimate parameters of parachute models from flight-test data has been developed (journal paper B.36). This effort was part of the development program for the Army Affordable Guided Airdrop System (AGAS), which is a low cost, high altitude, deployable airdrop system that is autonomously controlled via on-board GNC system to improve the accuracy of delivery despite uncertain winds.

Working in collaboration with engineers at Xerox, a robust estimation algorithm (REA) has been developed to calculate, from experimental data, the device-specific parameters of the so-called spectral Neugebauer model. This physics-based model is widely used to characterize the response of color printers. A case study with an actual printer has shown that REA achieves smaller approximation errors than other comparable methods; thus leading to better models of a printer's color map (journal paper B.33).

Real-time optimization algorithms for estimation and control

Funded by the NSF (award B.16), Professor Rotea has developed a mathematical framework for the analysis and synthesis of real-time optimization algorithms for state estimation and control. The results of this research have been used to develop a model-free algorithm than can identify and track the point of maximum performance of a thermoacoustic cooler by adapting geometry and sound field in real time autonomously (journal publication B.35).

The scope of the NSF project has been expanded to include the development of numerically efficient algorithms for model predictive control (MPC) and moving horizon estimation (MHE) that can be implemented in low-power embedded processors. This work has already produced a simple method for solving state estimation problems in the presence of constraints (journal publication B.38).

A new MPC formulation has been advanced in conference publication D.44. This formulation, called desensitized model predictive control, improves the robustness of the conventional MPC without the increase in on-line computational burden required by current robust MPC solutions.

Aircraft intent and trajectory prediction

Professor Rotea led a group of faculty, with expertise in engineering, aviation operations, and management, which was awarded seed funding to explore opportunities in air traffic research (award B.17). Professor Rotea's project has developed algorithms that can predict the trajectories and intents of multiple aircraft (journal publication B.37). Metron Aviation, a company that develops decision support

[8] Yang, M., RE: LFTB, E-mail to M. Rotea, 2002.

tools for the air traffic control system, has been an active collaborator in this project.

Diagnostics and prognostics of electric machines

Professor Rotea was a member of the Purdue Center for Security of Large Scale Systems. This center involves over 10 professors from six different disciplines (contracts B.22-24). The research conducted by the center sets the stage for the development of model-based diagnostics, prognostics, and control technologies, to monitor and enhance the security of assets of interest to the Air Force. Professor Rotea's project is focused on the development of a diagnostic and prognostic system to monitor and predict life of insulation windings in electric machines (conference paper D.41, submitted paper A.1). The results of this project will eventually feed into on-board diagnostic and prognostic systems that can present to pilots and operators an accurate picture of vehicle vulnerability in real time.

The research to date has helped center members (Pekarek, Rotea) secure a new subcontract on an STTR with the Navy (contracts B.25 and B.19). The goal of Prof. Rotea's work is to develop a virtual thermal sensor to infer temperatures at critical locations in aircraft generators using available measurements of electrical and mechanical variables and a minimal number of external temperature sensors.

B. Grants and contracts

Principal Investigator

1. "A State-Space Approach for Multiple Objective Synthesis of Linear Controllers," Research Initiation Award, NSF, August 1991-July 1994, $60,000.
2. "Multiple Objective Controller Synthesis via State-Space Methods—The H_2 norm case," Purdue Research Foundation, January 1992-June 1994, $19,950.
3. "NSF Young Investigator Award," NSF, October 1993-March 2000, $295,000.
4. "Boeing Faculty Fellowship," Boeing, October 1993-September 1996, $105,500.
5. "GE Junior Faculty Grant," GE Foundation program for Faculty of the Future, October 1993-September 1994, $7,000.
6. "UTRC Industrial Match," United Technologies Research Center, November 1996-August 1997, $20,000.
7. "Robust Control Analysis and Synthesis," United Technologies Research Center, September 1998-present, $37,500.
8. "Methods for Nonlinear Parameter Estimation," NASA/Indiana Space Grant Consortium, June 2000-May 2001, $5,000.
9. "Parameter Estimation for Airdrop Systems," Naval Postgraduate School, July 2000-May 2001, $33,304.
10. "New Algorithms for Extremum Seeking," Purdue Research Foundation, January 2001-December 2003, $25,292.
11. "Parameter Estimation for Airdrop Systems," Naval Fleet and Industrial Supply Center, July 2001-February 2002, $33,753.

12. Unrestricted Grant from United Technologies Research Center to participate of PW/UTRC one-day workshop on Tools for Mistuning Analysis in Turbomachinery, December 2001, $2,500.
13. "Robust Optimization of Color Printing Systems," Xerox Foundation, August 2001-July 2004, $66,000.
14. "Parameter Estimation for Airdrop Systems," Naval Fleet and Industrial Supply Center, April 2002-July 2002, $28,133.
15. "Parameter Estimation for Airdrop Systems," Naval Fleet and Industrial Supply Center, December 2002-September 2003, $26,867.
16. "Analysis and Design of Multivariable Extremum Seeking Algorithms," NSF, September 2000-August 2006, $243,414.
17. "Air Traffic Management for the 21st Century and Beyond," e-Enterprise Center and VP for Research, June 2003 through June 2005, $90,000, Co-PIs: D. Andrisani, T. Carney, A. Chaturvedi, and M. Nolan.
18. "Intergovernmental Personnel Act," NSF, $357,992, January 10, 2005—January 31, 2007.
19. M.A. Rotea, Thermal Observer for Health Management of Aircraft Generation Systems, subcontract from PC Krause and Associates (PCKA) as part of a Navy STTR program (Phase II), $142,112. February 25, 2008 – August 5, 2009. Awarded $22,130 to date.

Co-Investigator

20. Howell K.C. (PI) and M. Rotea, "Mission Design and Analysis Involving Formation Flying Near Libration Point Orbits," NASA, July 2003—June 2004, $75,000, responsible for $15,000.
21. Heister, M. Rotea, E. Coyle, J. Lehnert, S. Sudhoff, O. Wasynczuk, and D. Filmer "Center for Satellite Engineering," 1999 Academic Reinvestment Program at Purdue, May 1999—May 2002, $300,000.
22. Wasynczuk O. (PI), S. T. Revankar, C. Ong, J. P. Sullivan, C. M. Hoffmann, E. J. Coyle, M. A. Rotea, D.E. Adams, T. J. Downar, T. L. Skvarenina and D. J. Gotham, "Center for Security of Large Scale Systems," Air Force Research Laboratory, $1,027,984, March 2004—August 2005, responsible for $60,082.
23. Wasynczuk O. (PI), C. M. Hoffmann, E. J. Coyle, J. P. Sullivan, M. A. Rotea, D.E. Adams, S.D. Pekarek, S.T. Revankar, T. Fisher and T.L. Skvarenina, "Center for Security of Large Scale Systems," Air Force Research Laboratory, $1,018,279, April 2005—May 2006, responsible for $75,393.
24. Wasynczuk O. (PI), C. M. Hoffmann, E. J. Coyle, J. P. Sullivan, M. A. Rotea, D.E. Adams, S.D. Pekarek, S.T. Revankar, T. Fisher and T.L. Skvarenina, "Center for Security of Large Scale Systems," Air Force Research Laboratory, $746,182, July 2006—July 2007, responsible for $53,349.
25. Pekarek S., M.A. Rotea, "A noninvasive sensor/control suite for health monitoring and extended life of aircraft generation systems," subcontract from PC Krause and Associates (PCKA) as part of a Navy STTR program (Phase I), $30,000, August 2006—May 2007, responsible for $15,000.

Faculty Associate

26. Weisshaar T. (PI), "Aeroservoelastic Tailoring with Adaptive Materials," AFOSR, September 1991—September 1993, responsible for $18,231.
27. Skelton, R.E. (PI), "Multiobjective Spacecraft Control Design," NASA Marshall Space Flight Center, April 1992—April 1993, responsible for $2,950.

IV. PUBLICATIONS & PRESENTATIONS

A. Submitted papers

1. Saheba R., M.A. Rotea, O. Wasynczuk, S. Pekarek, and B. Jordan, "Real-time Thermal Observer for Electric Machines," submitted to *IEEE/ASME Transactions on Mechatronics***.**

B. Referred journal publications

1. Rotea, M.A. and J.L. Marchetti, "Internal model control using the linear quadratic regulator theory," ***Ind. Eng. Chemical Research***, Vol. 26, No. 3, pp. 577-581, 1987.
2. Khargonekar, P.P., I.R. Petersen, and M.A. Rotea, "H_∞ optimal control with state-feedback," *IEEE Transactions on Automatic Control*, Vol. 33, No. 8, pp. 786-788, 1988.
3. Rotea, M.A. and P.P. Khargonekar, "Stabilizability of linear time-varying and uncertain linear systems," *IEEE Transactions on Automatic Control*, Vol. 33, No. 9, pp. 884-887, 1988.
4. Rotea, M.A. and P.P. Khargonekar, "Stabilization of uncertain systems with norm bounded uncertainty—A control Lyapunov function approach," *SIAM Journal Control and Optimization,* Vol. 27, No. 6, pp. 1462-1476, 1989.
5. Khargonekar, P.P. and M.A. Rotea, "Multiple objective optimal control of linear systems: The quadratic norm case," *IEEE Transactions Automatic Control*, Vol. 36, No. 1, pp. 14-24, 1991.
6. Rotea, M.A. and P.P. Khargonekar, "H_2-optimal control with an H_∞-constraint: The state-feedback case," *Automatica*, Vol. 27, No. 2, pp. 307-316, 1991.
7. Khargonekar, P.P. and M.A. Rotea, "Mixed H_2/H_∞ control: A convex optimization approach," *IEEE Transactions on Automatic Control*, Vol. 36, No. 7, pp. 824-837, 1991.
8. Frazho, A. and M.A. Rotea, "A remark on mixed L_2/L_∞ bounds," *Integral Equations and Operator Theory*, Vol. 15, No. 2, pp. 343-348, 1992.
9. Rotea, M.A. and A. Frazho, "Bounds on solutions to H_∞ algebraic Riccati equations and H_2 properties of H_∞ central solutions," *Systems and Control Letters*, Vol. 19, No. 5, pp. 341-352, 1992.
10. Kaminer, I., P.P. Khargonekar, and M.A. Rotea, "Mixed H_2/H_∞ control for discrete-time systems via convex optimization," *Automatica*, *Special Issue on Robust Control*, Vol. 29, No. 1, pp. 50-70, 1993.
11. Rotea, M.A., "The generalized H_2 control problem," *Automatica*, Vol. 29, No. 2, pp. 373-385, 1993.
12. Rotea, M.A., M. Corless, D. Da, and I.R. Petersen, "Systems with structured uncertainty: Relations between quadratic and robust stability," *IEEE Transactions on Automatic Control*, Vol. 29, No. 5, pp. 799-803, 1993.
13. Swei, S., M.A. Rotea, and M. Corless, "System order reduction in robust stabilization problems," *International Journal of Control*, Vol. 60, No. 2, pp. 223-241, 1994.

14. Rotea, M.A. and D. Williamson, "Optimal realizations of finite wordlength digital filters and controllers," *IEEE Transactions on Circuits and Systems,* Series I: Fundamental Theory and Applications, Vol. 42, No. 2, pp. 61-72, 1995.
15. Rotea, M.A., M. Corless, and S. Swei, "Necessary and sufficient conditions for quadratic controllability of a class of uncertain systems," *Systems and Control Letters*, Vol. 26, No. 3, pp. 195-201, 1995.
16. Tsiotras, P., M. Corless, and M.A. Rotea, "Counter-example to a recent result on the stability of nonlinear systems," *IMA Journal of Mathematical Control & Information*, Vol. 13, No. 2, pp. 129-130, 1996.
17. Khargonekar, P.P., M.A. Rotea, and E. Baeyens, "Mixed H_2/H_∞ filtering," *International Journal of Robust and Nonlinear Control,* Vol. 6, pp. 313-330, 1996.
18. Rotea, M.A. and R.K. Prasanth, "An interpolation approach to multiobjective H_∞ design," *International Journal of Control*, Vol. 65, No. 4, pp. 699-720, 1996.
19. Zhu, G., M.A. Rotea, and R.E. Skelton, "A convergent algorithm for the output covariance constraint problem," *SIAM Journal on Control and Optimization*, Vol. 35, No. 1, pp. 341-361, 1997.
20. Iwasaki, T. and M.A. Rotea, "Rank-one scaled H_∞ optimization," *Transactions of the ASME: Journal of Dynamic Systems, Measurement, and Control*, Vol. 119, No. 3, pp. 513-520, 1997.
21. Iwasaki, T., S. Hara, and M.A. Rotea, "Computational complexity reduction in scaled H_∞ synthesis," *Automatica*, Vol. 33, No. 7, pp. 1325-1332, 1997.
22. Iwasaki, T. and M.A. Rotea, "Fixed order scaled H_∞ synthesis," *Optimal Control Applications and Methods*, Vol. 18, No. 6, pp. 381-398, 1997.
23. Prasanth, R. and M.A. Rotea, "Interpolation with multiple norm constraints," *Mathematics of Control, Signals, and Systems*, Vol. 10, No. 2, pp. 165-187, 1997.
24. Rotea, M.A., P. Tsiotras, and M. Corless, "Suboptimal control of rigid body motion with a quadratic cost," *Dynamics and Control*, Vol. 8, No. 1, pp. 55-81, 1998.
25. Tsiotras, P., M. Corless, and M.A. Rotea, "Optimal control of rigid body angular velocity with a quadratic cost," *Journal of Optimization Theory and Applications*, Vol. 96, No. 3, pp. 507-532, 1998.
26. Tsiotras, P., M. Corless, and M.A. Rotea, "An L_2 disturbance attenuation solution to the nonlinear benchmark problem," *International Journal of Robust and Nonlinear Control*, Vol. 8, No. 4-5, pp. 311-330, 1998.
27. Petersen, I.R., D. Macfarlane, and M.A. Rotea, "Optimal guaranteed cost control of discrete-time uncertain linear systems," *International Journal of Robust and Nonlinear Control*, Vol. 8, No. 8, pp. 649-657, 1998.
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34. D'Amato, F.J. and M.A. Rotea, "LFTB: An efficient algorithm to bound linear fractional transformations," *Optimization and Engineering, Springer*, Vol. 6, No. 2, pp. 177-201, 2005.
35. Li Y., M.A. Rotea, G. Chiu, L. Mongeau, I. Paek, "Extremum Seeking Control of Tunable Thermoacoustic Cooler," *IEEE Transactions on Control Systems Technology*, Vol. 13, No. 4, pp. 527-536, 2005.
36. Kothandaraman G. and M.A. Rotea, "SPSA Algorithm for parachute parameter estimation," *AIAA Journal of Aircraft*, Vol. 42, No. 5, pp. 1229-1235, 2005.
37. Lovera J., I. Hwang, and M.A. Rotea, "An Intent-Based Trajectory Prediction Algorithm for Air Traffic Control," *AIAA Journal of Guidance, Navigation, and Control,* Vol. 30, No. 2, pp. 370-382, 2007.
38. Rotea M.A. and C. Lana, "State estimation with probability constraints," *International Journal of Control*, Vol. 81, No. 6, pp. 920-930, June 2008.
39. Fang H., Lin. Z., and M. Rotea, "On IQC approach to the analysis and design of linear systems subject to actuator saturation, Systems and Control Letters, Vol. 57, No. 8, pp. 611-619, August 2008.

C. Chapters in books

1. Khargonekar, P.P. and M.A. Rotea, "Stabilization of uncertain systems with norm bounded uncertainties using control Lyapunov functions," Recent Advances in Robust Control, Editors P. Dorato and R. K. Yedavalli, IEEE Press: New York, pp. 112-117, 1990.
2. Khargonekar, P.P. and M.A. Rotea, "Optimal control with multiple objectives: The H_2 case," Recent Advances in Robust Control, Editors P. Dorato and R.K. Yedavalli, IEEE Press: New York, pp. 260-265, 1990.
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4. Rotea, M.A. and P.P. Khargonekar, "Generalized H_2/H_∞ control," Robust Control Theory, Editors B.A. Francis and P.P. Khargonekar, IMA Volumes in Mathematics and its Applications, Vol. 66, Springer Verlag: New York, pp. 81-104, 1995.

D. Referred conference publications

1. Rotea, M.A. and J.L. Marchetti, "Internal model control using the linear quadratic regulator theory," *Reunión de Trabajo en Procesamiento de la Información*, Buenos Aires, Argentina, Vol. I, 1985.
2. Rotea, M.A. and J.L. Marchetti, "Internal model control. Tuning in presence of constraints on the input," *Reunión de Trabajo en Procesamiento de la Información*, Buenos Aires, Argentina, Vol. I, 1985.
3. Rotea, M.A., D.J. Correa, and J.L. Marchetti, "By-Pass control of heat exchangers," *2° Congreso Latino Americano de Control Automático*, AADECA-IFAC Conference, Buenos Aires, Argentina, 1986.
4. Rotea, M.A. and J.L. Marchetti, "Control valves stabilization," *SBA 6° Congresso Brasileiro de Automatica*, SBA, Belo Horizonte, Brasil, pp. 320-324, 1986.
5. Rotea, M.A. and J.L. Marchetti, "Internal model control using the linear quadratic regulator theory," *American Control Conference*, Minneapolis, MN, Vol. 1, pp. 671-675, 1987.
6. Basualdo, M.S., M.A. Rotea, and J.L. Marchetti, "Compensator design in multiloop internal model control structures," *XIV Jornadas sobre Investigaciones en Ciencias de la Ingeniería Química y Química Aplicada*, Santa Fe, Argentina, Vol. II, pp. 191-196, 1987.
7. Rotea, M.A. and P.P. Khargonekar, "Mixed H_2/H_∞ control via convex programming," *American Control Conference*, Boston, MA, Vol. 2, pp. 1149-1154, 1991. **Best Paper Presentation Award**.
8. Rotea, M.A., "The generalized H_2 control problem," *First IFAC Symposium on Design Methods of Control Systems,* Zurich, Switzerland, Vol. 1, pp. 112-117, 1991.
9. Rotea, M.A. and P.P. Khargonekar, "Generalized H_2/H_∞ control via convex optimization," *30th Conference on Decision and Control,* Brighton, UK, Vol. 3, pp. 2719-2720, 1991.
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13. Zhu, G., M.A. Rotea, and R.E. Skelton, "A convergent feasible algorithm for the output covariance constraint problem," *American Control Conference*, San Francisco, CA, Vol. 2, pp. 1675-1679, 1993.
14. Corless, M., M.A. Rotea, and S. Swei, "System order reduction in quadratic stabilization problems," *IFAC 12th World Congress,* Sydney, Australia, Vol. 6, pp. 27-30, 1993.

15. Petersen, I.R., D. Macfarlane, and M.A. Rotea, "Optimal guaranteed cost control of discrete-time uncertain linear systems," *IFAC 12th World Congress*, Sydney, Australia, Vol. 1, pp. 407-410, 1993.
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17. Rotea, M.A., P. Tsiotras, and M. Corless, "Suboptimal control of rigid body motion with a quadratic cost," *IFAC Nonlinear Control Systems Design Symposium,* Tahoe City, CA, 5 pages, 1995.
18. Hara, S., T. Iwasaki, and M.A. Rotea, "Nonconvex constraint reduction in scaled H_∞ synthesis," *24th SICE Symposium on Control Theory*, Kariya, Japan, pp. 19-24, 1995.
19. Rotea, M.A. and D. Viassolo, "Optimal realizations of FWL digital systems: Numerical Examples," *Matlab Conference*, Boston, MA, 1995. (Presentation only.)
20. Rotea, M.A., L. A. Randall, G. Song, and S.P. Schneider, AIAA 96-2278: "Model identification of a Kulite pressure transducer," *19th AIAA Advanced Measurement and Ground Testing Technology Conference*, New Orleans, LA, 1996.
21. Prasanth, R.K. and M.A. Rotea, "Interpolation with multiple norm constraints," *Symposium on the Mathematical Theory of Networks and Systems-MTNS 96*, St. Louis, MO, 1996.
22. Lu, J. and M.A. Rotea, "Robust stabilization for systems with rank-one uncertainty structure," *34th Annual Allerton Conference on Communication, Control, and Computing*, Monticello, IL, pp. 122-131, 1996.
23. Tsiotras, P., M. Corless, and M.A. Rotea, "Optimal control of rigid body angular velocity with quadratic cost," *35th Conference on Decision and Control*, Kobe, Japan, pp. 1630-1635, 1996.
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25. Prasanth, R.K. and M.A. Rotea, AIAA-1997-3700: "Design tools for multiobjective H_∞ control," *AIAA Guidance, Navigation, and Control Conference*, New Orleans, LA, Vol. 3, pp. 1270-1279, 1997.
26. Rotea, M.A. and J. Marchetti, "Integral control of heat-exchanges-plus-bypass systems," *International Conference on Control Applications*, Hartford, CT, pp. 151-156, 1997.
27. D'Amato, F. and M.A. Rotea, "Limits of achievable performance and controller design for the structural control benchmark problem," *Conference on Control Application*, Hartford, CT, pp. 547-552, 1997.
28. Viassolo D. and M.A. Rotea, "Practical design of multirate output controllers," *37th Conference on Decision and Control*, Tampa, FL, Vol. 1, pp. 337-342, December 1998.
29. D'Amato, F.J., A. Megretski, U.T. Jonson, and M.A. Rotea, "Integral quadratic constraints for monotonic and slope restricted diagonal operators," *American Control Conference*, San Diego, CA, pp. 2375-2379, 1999. **Best Paper Presentation Award**.
30. Rotea, M.A., "Design of static cascade compensators using generalized singular values," *Conference on Control Applications and Computer Aided Control Systems Design*, Kona, Hawaii, pp. CACSD 340-346, 1999.

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33. Rotea M.A. and F. D'Amato, AIAA-2002-4041: "New Tools for Analysis and Optimization of Mistuned Bladed Disks," *38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit*, Indianapolis, IN, 2002.
34. Viassolo, D. and M.A. Rotea, "Design of Multirate Output Controllers with an Engineering Application," *IFAC 15th World Congress*, Barcelona, Spain, 2002.
35. Kothandaraman G. and M.A. Rotea, AIAA 2003-2118: "SPSA Algorithm for Parachute Parameter Estimation," *17th AIAA Aerodynamic Decelerator Systems Technology Conference and Seminar*, Monterey, CA, pp. 138-148, 2003.
36. Lana C., M.A. Rotea, and D.E. Viassolo, "Characterization of Color Printers Using Robust Parameter Estimation," *IS&T/SID 11th Color Imaging Conference*, Scottsdale, Arizona, pp. 224-231, 2003.
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39. Lovera Yepes, J., I. Hwang, and M.A. Rotea, AIAA-2005-5824: "An Intent-Based Trajectory Prediction Algorithm for Air Traffic Control," *AIAA Guidance, Navigation, and Control Conference and Exhibit*, San Francisco, CA, 2005.
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41. Saheba R., M.A. Rotea, O. Wasynczuk, S. Pekarek, and B. Jordan, "Real-time Thermal Observer for Electric Machines," *SAE Power Systems Conference,* New Orleans, Louisiana, November 7-9, 2006.
42. Fang H., Lin Z, and M. Rotea, "On IQC approach to the analysis and design of linear systems subject to actuator saturation," *45th IEEE Conference on Decision and Control*, San Diego, December 13-15, 2006.
43. Lana C. and M. Rotea, "Desensitized model predictive control," 15th Mediterranean Conference on Control and Automation, Athens, June 27-29, 2007.
44. Lana C. and M. Rotea, "Desensitized Model Predictive Control Applied to a Structural Benchmark Problem," 17th IFAC World Congress, Seoul, Korea, July 6-11, 2008.

E. Invited conference publications

1. Khargonekar, P.P. and M.A. Rotea, "Coprime factorizations for linear time-varying systems," *American Control Conference*, Atlanta, GA, Vol. 2, pp. 848-851, 1988.

2. Khargonekar, P.P. and M.A. Rotea, "Stabilization of uncertain systems with norm bounded uncertainties using control Lyapunov functions," *27th Conference on Decision and Control*, Austin, TX, Vol. 1, pp. 503-507A, 1988.

3. Khargonekar, P.P. and M.A. Rotea, "Optimal control with multiple objectives: The H_2 case," *American Control Conference*, Pittsburgh, PA, Vol. 1, pp. 171-176, 1989. **Best Paper Presentation Award**.

4. Rotea, M.A. and P.P. Khargonekar, "Simultaneous H_2/H_∞ optimal control with state-feedback," *American Control Conference*, San Diego, CA, Vol. 3, pp. 2380-2384, 1990.

5. Rotea, M.A. and P.P. Khargonekar, "LQG control with an H_∞ constraint via convex programming," *28th Allerton Conference on Communication, Control and Computing*, Monticello, IL, 1990. (Presentation only.)

6. Rotea, M.A., M. Corless, D. Da, and I.R. Petersen, "Systems with structured uncertainty: Relations between quadratic and robust stability," *29th Allerton Conference on Communication, Control and Computing*, Monticello, IL, pp. 885-894, 1991.

7. Khargonekar, P.P. and M.A. Rotea, "Mixed H_2/H_∞ filtering," *31st Conference on Decision and Control*, Vol. 2, pp. 2299-2304, Tucson, AZ, 1992.

8. Rotea, M.A. and I. Kaminer, "Generalized H_2/H_∞ control of discrete time systems," *IFAC 12th World Congress*, Sydney, Australia, Vol. 5, pp. 239-242, 1993.

9. Rotea, M.A. and R.K. Prasanth, "Multiobjective H_∞ control," *Third SIAM Conference on Linear Algebra, Signals, Systems, and Control*, presentation in the invited session on Convex Optimization in Control Systems Analysis and Design, Seattle, WA, 1993.

10. Rotea, M.A. and D. Williamson, "H_2 and H_∞ optimal realizations of finite wordlength digital filters," *31st Annual Allerton Conference on Communication, Control, and Computing*, Monticello, IL, pp. 505-514, 1993.

11. Rotea, M.A., "Control systems design with H_2 and H_∞ design specifications," *Joint Mathematics Meetings, American Mathematical Society 100th Annual Meeting*, AMS Abstracts, Vol. 15, No. 1, p. 159, session title: Operator theory, control theory, and nonselfadjoint algebras, Cincinnati, OH, 1994.

12. Rotea, M.A. and T. Iwasaki, "An alternative to the D-K iteration?" Invited session "Linear matrix inequalities in control theory-I," *American Control Conference*, Baltimore, MD, Vol. I, pp. 53-57, 1994.

13. Rotea, M.A. and R.K. Prasanth, "The rho performance measure: A new tool for controller design with multiple frequency domain specifications," Invited session "Linear matrix inequalities in control theory-II," *American Control Conference*, Baltimore, MD, Vol. I, pp. 430-435, 1994.

14. Rotea, M.A. and D. Williamson, "Optimal realizations of finite wordlength digital controllers via affine matrix inequalities," Invited session "Linear matrix inequalities in control theory-II," *American Control Conference*, Baltimore, MD, Vol. I, pp. 445-449, 1994.

15. Rotea, M.A. and R.K. Prasanth, "An interpolation approach to multiobjective H_∞ design," Invited session "Multiobjective robust control," *33rd Conference on Decision and Control*, Orlando, FL, Vol. III, pp. 2696-2701, 1994.

16. Tsiotras, P., M. Corless, and M.A. Rotea, "An optimal L_2 disturbance rejection approach to the nonlinear benchmark problem," *American Control Conference*, Seattle, WA, Vol. 6, pp. 4352-4356, 1995.
17. Prasanth, R.K. and M.A. Rotea, "Interpolation with multiple norm constrains," *33rd Annual Allerton Conference on Communication, Control, and Computing*, Monticello, IL, 1995.
18. Rotea, M.A. and T. Iwasaki, "Generalized H_2/H_∞ control: general formulas," *34th Conference on Decision and Control,* New Orleans, LA, Vol. III, pp. 3158-3163, 1995.
19. Rotea, M.A., "Analysis of Multivariable Extremum Seeking Algorithms," *American Control Conference*, Chicago, IL, pp. 433-437, 2000.
20. Rotea, M.A. and F. D'Amato, "LFTB: An optimized algorithm to bound worst-case frequency response functions," *American Control Conference*, Washington D.C., pp. 3041-3048, 2001. **Best Paper Presentation Award**.
21. Rotea, M.A. and F. D'Amato, "Efficient Algorithms for Mistuning Analysis in Turbomachinery," *IFAC 15th World Congress*, Barcelona, Spain, 2002.
22. Rotea M. and C. Lana, "A Robust Estimation Algorithm for Printer Modeling," **Tutorial Session on Sensing, Modeling and Control of Xerography**, *American Control Conference*, Boston, MA, pp. 2636-2641, 2004.
23. Adams, D.E., M. J. Smith, A. Chaturvedi, M. Rotea, C. Hoffmann, B. Craig, **"**Integrated Prognostic System of Systems Health Management," *Materials Science and Technology Conference*, session on Materials Damage Prognosis, New Orleans, LA, 2004.
24. Rotea M., "Semidefinite Programming—Applications in Systems and Controls," **Tutorial Session Convex Optimization Part II: Duality, Algorithms & More Applications**, H. Hindi (Organizer), *American Control Conference*, Minneapolis, MN, 2006. (Presentation only.)

F. Selected industrial reports

1. Rotea, M. A., "Control of Aeromechanical Instabilities using Fuselage Position and Velocity Feedback," Rotorcraft Industry Technology Association (RITA), 1996.
2. Rotea, M. A., "A New Static Controller Architecture," Rotorcraft Industry Technology Association (RITA), 1997.
3. Rotea, M.A., "A dual optimization approach for solving constrained least-squares problems," Chapter 3, Report R98-05, United Technologies Research Center, 1998.
4. Rotea, M.A., "Performance limits and actuator requirements analysis for the Sikorsky active noise control systems," Chapter 4, Report R98-05, United Technologies Research Center, 1998.
5. Rotea, M.A. and W.H. Weller, "Aeromechanical stabilization: Correlation with the 1997 test program and RAH-066 projection," United Technologies Research Center, 1998.
6. Rotea, M.A., "Calibration of the F119 HFB FEM: Data analysis and sensor requirements," United Technologies Research Center, 1998.

G. Manuals

1. Rotea, M.A. and F.J. D'Amato, "Structural Optimization on Bladed-Disk Assemblies," Matlab Toolbox User's Guide, Version 1.0, 2000.
2. D'Amato F.J. and M.A. Rotea, "Linear Fractional Transformation Bounds (LFTB), Structural Optimization on Bladed-Disk Assemblies," Matlab Toolbox User's Guide, Version 1.1, 2001.

H. Invited workshop presentations

1. Khargonekar, P.P. and M.A. Rotea, "Controller synthesis for multiple objective optimal control," International Workshop on Robust Control, San Antonio, TX, 1991.
2. Rotea, M.A., M. Corless, D. Da, and I.R. Petersen, "Systems with structured uncertainty: relations between quadratic and robust stability," International Workshop on Robustness of Control Systems, Das Kloster Kappel Am Albis, Switzerland, 1991.
3. Rotea, M.A., "Controller synthesis with H_2 and H_∞ design specifications," Workshop on Robust Control Theory, Institute for Mathematics and its Applications, University of Minnesota, MN, 1992.
4. Corless, M., M.A. Rotea, and S.M. Swei, "System order reduction in the stabilization of multi-block uncertain systems," Workshop on Robust Control, Palm Cove, Queensland, Australia, 1993.
5. Corless, M., M.A. Rotea, and S.M. Swei, "System order reduction in the stabilization of multi-block uncertain systems," Seventh Workshop on Dynamics and Controls, Ulm, Germany, 1994.
6. Iwasaki, T., S. Hara, and M.A. Rotea, "Computational complexity reduction in the globally optimal scaled H_∞ synthesis," International Workshop on Robust Control, Napa, CA, 1996.
7. Gysling, D., C.A. Jacobson, G. Rey, and M.A. Rotea, "Identification and validation of UTRC flutter model," AFOSR-PRET Workshop on Robust Control of Aeroengines, University of California, Santa Barbara, CA, 1997.
8. Gysling, D., C.A. Jacobson, G. Rey, and M.A. Rotea, "Experimental results on the UTRC 17-inch flutter rig," AFOSR-PRET Workshop on Robust Control of Aeroengines, University of California, Santa Barbara, CA, 1997.
9. Rotea, M.A., "Workshop on future directions in systems and control," Discussion Leader in Prof. Goodwin's talk, University of Illinois at Urbana-Champaign, Monticello, IL, 1997.
10. Rotea M.A. and F. D'Amato, "SODA: Structural Optimization of Bladed-Disk Assemblies," Pratt and Whitney, Middletown, CT, 2000.
11. Rotea M.A., "Theory and use of LFTB," PW/UTRC Workshop on Tools for Mistuning Analysis in Turbomachinery, United Technologies Research Center, East Hartford, CT, 2001.
12. Adams, D.E., M. J. Smith, A. Chaturvedi, M. Rotea, C. Hoffmann, B. Craig, **"**Integrated Prognostic System of Systems Health Management," Workshop on Integrated Systems Health Monitoring, Air Force Research Laboratory, Dayton, Ohio, 2004.

I. Invited lectures

1. "Controller synthesis with H_2 and H_∞ design specifications," Coordinated Science Laboratory, University of Illinois, Urbana, IL, 1993.
2. "Multiple objective optimal control with H_2 and H_∞ design objectives," Department of Aerospace Engineering and Engineering Mechanics, University of Texas, Austin, TX, 1993.
3. "Controller design with multiple frequency domain design specifications," SMAC seminar, School of Mechanical Engineering, Purdue University, West Lafayette, IN, 1993.
4. "Multiobjective optimal control: A simple gust alleviation example," Technical Presentation to the Mathematics and Engineering Analysis Division of Boeing Information & Support Services, Seattle, WA, 1995.
5. "Controller design with multiple frequency domain design specifications," Technical Presentation to members of the Military Airplanes Division, Boeing Defense and Space Group, Seattle, WA, 1995.
6. "Controller design with multiple frequency domain specifications," College of Engineering Seminar, University of California, Berkeley, CA, 1995.
7. "Fixed point implementation of digital controllers," Honeywell Technology Center, Honeywell, Minneapolis, MN, 1996.
8. "Tools for controller synthesis with multiple design objectives," United Technologies Research Center, United Technologies Corporation, East Hartford, CT, 1996.
9. "Limits of achievable performance and controller design for the structural control benchmark problem," Computer Integrated Process Operations Center (CIPAC) Seminar Series, School of Chemical Engineering, Purdue University, West Lafayette, IN, 1997.
10. "Tools for IBR analysis and blending," Pratt and Whitney, East Hartford, CT, 1999.
11. "Optimization and Control of Complex Dynamic Systems," Electrical and Communication Systems, NSF, Arlington, VA, 2001.
12. "Tools for the Analysis and Optimization of Frequency Response in Systems with Symmetry," Control Seminar Series, University of Michigan, Ann Arbor, MI, 2001
13. "Tools for the Analysis and Optimization of Frequency Response in Systems with Symmetry," United Technologies Research Center, East Hartford, CT, 2001.
14. "Tools for the Analysis and Optimization of Frequency Response in Systems with Symmetry," Control and Dynamical Systems Seminar Series, Caltech, Pasadena, CA, 2001.
15. "Tools for the Analysis and Optimization of Frequency Response in Systems with Symmetry," Mechanical and Aerospace Engineering Seminar Series, University of Virginia, Charlottesville, VA, 2001.
16. "Tools for the Analysis and Optimization of Frequency Response in Systems with Symmetry," ME 681 Graduate Student Seminar, Texas A&M University, College Station, 2001.

17. "Semidefinite Programming: Applications in Systems and Control," **Plenary**, IX Reunión de Trabajo en Procesamiento de la Información y Control, Santa Fe, Argentina, 2001.
18. "Semidefinite Programming: Applications in Systems and Control," Distinguished Seminar Series, Mechanical and Industrial Engineering, University of Illinois, Urbana, IL, 2001.
19. "Semidefinite Programming: Applications in Systems and Control," Graduate Seminar Series, Aerospace Engineering and Mechanics, University of Minnesota, Minneapolis, MN, 2002.
20. "Optimization and Control of Civil and Mechanical Systems," Mechanical and Aerospace Engineering, University of Florida, Gainesville, 2002.
21. "Optimization and Control of Civil and Mechanical Systems," Civil and Mechanical Systems Division, NSF, Arlington, VA, 2004.
22. "Optimization and Control of Engineered Dynamic Systems," Control Seminar Series, University of Michigan, Ann Arbor, MI, 2006.
23. "Optimization and Control of Mechatronic Systems," **Plenary #2**, IEEE International Conference on Mechatronics and Automation (ICMA), Harbin, China, August 5-8, 2007.
24. "Optimization and Control of Mechanical and Aerospace Systems, Graduate Seminar, Worcester Polytechnic Institute, Worcester, MA, 2007.

J. Other publications and presentations

1. Rotea M.A., "Changes and opportunities in Dynamic Systems and Controls at NSF," Dynamic Systems and Controls Division of the ASME, Spring 2005 Newsletter.
2. Rotea M., "Funding opportunities in Mechatronics," Panel on Grand Challenges of Advanced Intelligent Mechatronics, *Advanced Intelligent Mechatronics*, Monterey, CA, 2005.
3. Rotea M., IMECE2005-83017: "Funding opportunities in Control Systems," *ASME International Mechanical Engineering Congress and Exposition*, Orlando, FL, 2005.
4. Rotea M., "NSF Programs of Relevance to the ACC Community," Special Session, *2006 American Control Conference*, Organizer: M. Tomizuka, Minneapolis, MN, 2006.

VII. LEADERSHIP & SERVICE

A. Statement of contributions

Strategic Initiatives at Purdue University

Professor Rotea was the co-founding director of the Center for Satellite Engineering. In 1999, he and Prof. Heister led the multidisciplinary faculty group that won a university-wide competition to create this center (grant B.21). This activity provides undergraduate and graduate students a systems engineering view of satellite systems through lecture courses and design projects. TRW Space and Defense and Boeing Satellite Systems have supported this center through gifts and interactions with their engineers and managers. Their primary interest has been the access to undergraduate students that understand the role and significance of systems engineering to this industry.

Professor Rotea has been actively involved with the signature areas of the College of Engineering. He has been an intellectual contributor to two signature areas: Intelligent Infrastructure Systems and Systems of Systems. He has also been instrumental in faculty recruiting and hiring within these signature areas.

Professor Rotea has participated in the drafting of the Strategic Plan for the College of Engineering. In 2002, the faculty elected him to the Engineering Area Promotions Committee, which is the engineering body that recommends promotion and tenure cases to the university-wide committee. He was also a member of the Engineering Tenure and Promotion Procedures and Practices Committee that conducted an extensive examination of the promotion and tenure procedures and practices across the College of Engineering and published its findings and recommendations in May 2004. Through the course of these activities, he has proposed metrics to access quality and long-term impact of research and education.

Program Management and Outreach at the NSF

From January 2005 to January 2007, Professor Rotea was the Program Director for Control Systems in the Division of Civil, Mechanical, Manufacturing and Innovation Systems (CMS) at the National Science Foundation. This program enables research and education in the prediction and control of complex systems, with broad applicability to civil, mechanical, manufacturing and aerospace systems. During his tenure the success rate for competitive proposals grew from about 10% in FY'04 to 18% in FY'06. This increase is, in part, due to several leveraging efforts established with other programs and initiatives at the NSF.

Professor Rotea has represented CMS in two NSF-wide initiatives: Dynamic Data Driven Application Systems (DDDAS) and Mathematical Sciences: Innovations at the Interface with the Sciences and Engineering. In FY'05, he leveraged the CMS fund commitment for DDDAS with funds from other programs and agencies to reach a total investment of $3.5M for the CMS-relevant DDDAS awards, leading to a success rate in excess of 15%. He was also one of the program directors crafting the solicitation NSF 06-596, Emerging Frontiers in Research and Innovation (EFRI), with funding for FY'07 set at $22,000,000 approximately.

He was also the Chair for the Complex Systems Engineering Working Group, a group whose responsibility was to work with the community to identify a research agenda, for the Directorate of Engineering (ENG), in the broad area of complex systems. As chair of this working group, Professor Rotea has been instrumental in the creation of the EFRI solicitation, with a component that supported fundamental research in the broad area of auto-reconfigurable engineered systems integrating physical, information, and knowledge domains.

Professor Rotea has given invited talks describing NSF programs and funding opportunities at national and international conferences. He assisted several organizations at NSF by providing internal reviews and expert opinion. Most notable was his participation in the site visits for the Engineering Research Center competition and the internal reviews for the Office of International Science and Engineering.

Leadership at the University of Massachusetts Amherst

Professor Rotea is a strategist who has prepared himself, through experiences in academia, industry, and the federal government, to take an academic program to its next level of excellence. In April 2007, he joined the University of Massachusetts as the Head of the Department of Mechanical and Industrial Engineering (MIE) to pursue this new direction in his career.

Since joining MIE, Prof. Rotea has focused on increasing the visibility, reputation, and diversity of the program as well as the size of the faculty. His efforts have been directed at making a case for MIE than builds on existing strengths in areas of relevance to modern society, a substantial interest from diverse stakeholders in mechanical engineering research and education, and the projected penetration of industrial engineering research and education in the health care and service sectors.

Professor Rotea is working with the faculty to create a vision for MIE where key technical areas converge to give rise to research and educational programs that advance two sectors of modern society: energy and healthcare. He has articulated this vision to the upper administration, industry, and the alumni, with good results. This work has led to two new positions in the department and gifts from industry. He has hired three new faculty members (one female), two support health care engineering and one supports the wind energy program at UMass. He is currently facilitating the development of a proposal for a federally funded center in renewable energy.[9] He is working with the faculty to develop of an aggressive hiring plan that calls for new faculty in the areas of wind energy systems, energy conversion and utilization, biomedical (materials, devices, systems, and protocols), and mechatronic systems and cyber-networks of sensors and actuators of relevance to energy and healthcare.

[9] See, for example, section IV.1 of the report on clean energy from the University of Massachusetts; available on line at http://www.umass.edu/research/system_clean_energy_report_08.pdf

B. Major committee assignments

School of Aeronautics and Astronautics – Purdue University

- Member, Dynamics and Control Area Committee, School of Aeronautics and Astronautics, August 1990—July 2007.
- Member, Laboratory Committee, School of Aeronautics and Astronautics, August 1998—July 2004.
- Member, Astronautics Search Committee, School of Aeronautics and Astronautics, August 1999—January 2000.
- Member, Head Advisory Committee, School of Aeronautics and Astronautics, August 2003—July 2005.

College of Engineering – Purdue University

- Co-Founding Director, Center for Satellite Engineering, College of Engineering, August 1999—July 2002.
- Member, Drafting Committee for the Engineering Strategic Plan, College of Engineering, July—December 2002.
- Member (Elected by the Faculty), Engineering Area Promotion Committee, College of Engineering, August 2003—July 2005.
- Member, Engineering Ad-Hoc Committee for Promotion and Tenure Procedures and Practices, College of Engineering, August 2003—May 2004.
- Member, Minority in Engineering Program Director Search Committee, College of Engineering, August—December 2003.
- Member, Intelligent Infrastructure Systems Search Committee, College of Engineering, August 2003—July 2004.

College of Engineering – University of Massachusetts Amherst

- Executive Council, April 2007—present.

University

- Member (Elected by the Faculty), Purdue University Senate, August 1995—July 1997.

C. Service to government

- Panelist, NSF ERC Panel for evaluation of full proposals and site visit recommendation, January 2008.
- Panelist, NSF, Proposal Review Panels in 1992, 1995, 1997, 1998, 2000, 2002, 2003, and 2004.
- Member, Agencia Nacional de Promoción Científica y Tecnológica, Argentina.

- Chair, Complex Systems Working Group, Engineering Directorate, NSF, March 2005—January 2007.
- Member, Engineering Education Working Group, Engineering Directorate, NSF, October 2005—January 2007.
- Member, Dynamic Data Driven Applications Systems Working Group, NSF, January 2005—January 2007.
- Member, Mathematical Sciences: Innovations at the Interface with the Sciences and Engineering, NSF, January 2005—January 2007.

D. Service to professional organizations

Boards of Professional Societies

- Member (elected), Board of Governors, IEEE Control Systems Society, January 2007—December 2009.
- Member, IEEE Control Systems Society Conference Editorial Board, 1995-1998.
- Associate Editor, Editorial Board of the IEEE Transactions on Automatic Control, January 2004-December 2005.

Major Committees

- Member, Student Best Paper Award Committee, IEEE Conference on Decision and Control, 1994.
- Member, D.P. Eckman Award Subcommittee[10], American Automatic Control Council, 1995 and 2003.
- Chair, D.P. Eckman Award Subcommittee, American Automatic Control Council, 2002.
- Member, Program Committee, American Control Conference, 1992 and 2005.

Technical Reviews

- Book reviewer for SIAM and Cambridge University Press.
- Reviewer for the following journals: AIAA Journal of Guidance, Control, and Dynamics; ASME Journal of Dynamic Systems, Measurement, and Control; IEEE Transactions on Automatic Control; IEEE Control Systems Technology; Systems and Control Letters; Automatica; SIAM Journal on Control and Optimization; International Journal of Control; Optimization and Engineering; etc.
- Reviewer for the American Control Conference, the IEEE Conference on Decision and Control, and other conferences.

[10] This subcommittee recommends to the Council the best control engineer in the US under age 35.

Chairperson at conferences

- Chairman and Co-Chairman in several technical sessions at multiple instances of the American Control Conference and the IEEE Conference on Decision and Control.
- Co-Organizer, Invited Session "Theory and Application of Extremum Seeking Control," American Control Conference, Chicago, IL, June 2001.

VIII. OTHER

A. Post-Doctoral Associates

- Dr. Panagiotis Tsiotras (Professor at Georgia Institute of Technology), January 1994—July 1994. (Journal papers B.24, B.25, B.26.)
- Dr. Tetsuya Iwasaki (Professor at University of Virginia, Charlottesville), March 1994—February 1995. (Journal papers B.20, B.21, B.22.)
- Dr. Xin Chen, October 1995—July 1996.
- Dr. Dario Baldelli, June 2001—May 2002.

B. Visiting Researchers

- Professor Alberto Herreros-Lopez (Universidad de Valladolid, Spain), 1997-1998.
- Professor Ricardo Sanchez-Pena (Universidad de Buenos Aires, Argentina), 2001.

C. Main international activities

In 1993, Professor Rotea was a Visiting Fellow at the Australian National University. He visited the Interdisciplinary Engineering Program and collaborated with Prof. Darrell Williamson in the area of fixed-point implementation of signal processing and control algorithms (journal paper B.14). In 2002, Professor Rotea was a Visiting Professor at the University of Valladolid, Spain, where he delivered a short course on robust multivariable control for students in the Process & Systems Engineering Doctoral Program.

D. Consulting contracts

- United Technologies, optimization and control of mechanical and aerospace systems, 1996, 1997, 1998, 2001.
- PC Krause and Associates, 2006, 2007.