

Biswa Nath Datta, Ph.D., IEEE Fellow

Distinguished Research Professor

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EDUCATION:

Degree	Date	Institution	Location
Ph.D.	1972	University of Ottawa	Ontario, Canada
M.Sc.	1970	McMaster University	Hamilton, Ontario

AREAS OF SPECIALIZATION AND/OR PRESENT RESEARCH INTERESTS:

- Numerical linear Algebra
- Numerical Analysis and Scientific Computing
- Applied and Computational Control and Vibration Engineering

PROFESSIONAL EXPERIENCE:

<i>Rank/Title</i>	<i>Institution/Location</i>	<i>Date(s)</i>
Distinguished Research Professor	Northern Illinois University	2005-Present
Presidential Research Professor	Northern Illinois University	2001-2005
Professor of Mathematical Sciences	Northern Illinois University	1981-2001
Adjunct Professor of Electrical & Mechanical Engineering	Northern Illinois University	Fall 2003-Present
Director of Applications Involvement Component (AIC) of Doctoral Program in Mathematical Sciences	Northern Illinois University	1993-1996

Visiting Professor <i>Computer Science Department</i>	University of Illinois at <i>Urbana-Champaign</i>	Spring 1985
Visiting Professor	University of California-San Diego	1987-1988
Visiting Professor <i>University Park, Computer Science Department</i>	Pennsylvania State University	1980-1981
Visiting Professor	Universite' du Littoral, Calais, France	May - June 2007
Visiting Professor	University of Athens, Athens, Greece	June 2007
Visiting Professor	University of Aveiro, Aveiro, Portugal	January 2006
Distinguished Visiting Research Professor <i>Department of Computer Science and Department of Mechanical Engineering</i>	University of Adelaide, Australia	August 1998 & December 1994
Visiting Research Scientist	Boeing Computer & Information Services, Seattle	July 1997 & October 1989, 1996
Distinguished Visiting Research Scientist	Universidad Catolica del Norte Antofagasta, Chile <i>(Funded by Chilean Research Council)</i>	May-June 1997 & January 1999
Distinguished Visiting Research Scientist	Federal University of Rio de Janeiro & Federal University of Rio Grandedo Sul, Brazil <i>(Funded by Brazilian Research Council)</i>	June 1997
Visiting Scientist	National Aeronautics Laboratory Bangalore, India	December 1992
Visiting Professor	Hong Kong Polytechnic University	June 1991 & June 2006
Visiting Professor	Indian Institute of Science Bangalore, India	July 1991 & July 1987
Visiting Professor	Indian Institute of Technology Kharagpur, India	July 1991
Visiting Professor	National University of Singapore	August 1990
Distinguished Visiting Research Scientist	Federal University of Rio de Janeiro & State University of Campinas, Brazil <i>(Funded by Brazilian Research Council)</i>	August 1990
Distinguished Visiting Research Scientist	Polytechnic University of Valencia, Spain <i>(Funded by Spanish Research Council)</i>	June 1990 & Summer 1989
Visiting Professor	Dept. of Information Sciences, Tokyo Denki University of Tokyo, Japan	1988

Visiting Professor	Indian Institute of Science	July 1987
Visiting Professor	University of Bielefeld West Germany	June 1987
Visiting Scientist	Queen Mary College, London	Summer 1987
Visiting Professor	Israel Institute of Technology Haifa, Israel	December 1986
Senior Associate Professor	State University of Campinas Campinas, Brazil	1975-80
Visiting Research Scientist	Gas Turbine Research Establishment Bangalore, India	1973

HONORS AND AWARDS

- **Honored for “Outstanding Contributions to Numerical Linear Algebra related to Control” in an special IEEE-organized Banquet Honoring Ceremony** during the *International Workshop on Numerical Linear Algebra in Signals, Systems, and Control*, Indian Institute of Technology, Kharagpur, India, January 9-11, 2007.
- A research monograph on **Numerical Linear Algebra in Signals, Systems, and Control**, dedicated to me with contributions from the leading researchers, will be published by Springer and Verlag, 2009.
- **Senior Fulbright Specialist Award**, 2006 and 2008 (Selection as a Senior Fulbright Specialist is done by Fulbright Foreign Scholarship Board, (*FSB*), the Bureau of Education and Cultural Affairs of the Department of State (*ECA*), and the Council for International Exchange of Scholars (*CIES*) on a world wide competition and recognizes the “qualities of excellence and leadership”).
- **Presidential Research Professor**, Northern Illinois University, 2001-2005.
- **Fellow** of IEEE (Institute of Electrical and Electronics Engineering). (*Election to the Grade of IEEE Fellow acknowledges outstanding contributions and exceptional professional distinction.*)
- **IEEE Distinguished Lecturer Award** by IEEE Chapter of Indian Institute of Technology (Kharagpur), January 2, 1999.
- **IEEE Plaque of Honor** by IIT- Kharagpur Chapter, January, 2005 and January, 2006.
- **IEEE Plaque of Honor** by IEEE-Northern Illinois University Chapter, November, 2005.
- **International Federation of Nonlinear Analysis (IFNA)** plaque of honor, Turkey, 2001 (*for outstanding contribution to mathematics*).
- Elected as an “**Academician**” by **Academy of Nonlinear Sciences, (ANS), Moscow, Russia, 2002**. *Election to the memberships of ANS recognizes outstanding leadership and contributions in mathematics, mechanics, modeling, and control theory.*

PANELIST FOR PANEL DISCUSSION ON

- Future Directions of Research and Teaching in Mathematical Control and Systems Theory, MTNS’2002, August, 2002 (**Chair of the Panel**).

- IEEE Panel on Admission and Advancement, Chicago, October, 1997.
- “Parallel Computations in Control and Future Directions,” IEEE Conference on Decision and Control, 1991:
- “Large-Scale and Parallel Computations in Control”, American Control Conference, 1992.

ASSESSORS OF RESEARCH PANELS

- Australian Research Council
- Chilean Research Council
- City University of Hong Kong
- Hong Kong Research Council
- Polytechnic University of Hong Kong

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

SIAM (Society for Industrial and Applied Mathematics)
 ILAS (International Linear Algebra Society)
 SIAM Activity Group on Linear Algebra
 SIAM Activity Group on Control
 IEEE (Institute of Electrical and Electronics Engineering)

POSITIONS IN PROFESSIONAL SOCIETIES

- **Vice Chair**, *SIAM, Linear Algebra Activity Group*, 1992-1998.
- **Representative at Large**, International Board of the *International Linear Algebra Society*, 1987-.
- **Member of the Education Committee**, *International Linear Algebra Society*, 1987-.
- **A Government of India appointed member of Overseas Panel of Scientists** for *Council of Scientific and Industrial Research*, Government of India, 1992-.
- **Chairman of the SIAM Award Committee** for the Best paper in Linear Algebra, 1993, 1996.
- **Invited Member** of the *Hans Schneider Award Committee*, 1999 (*sponsored by International Linear Algebra Society*).

GRANTS:

1. **Collaborative Proposal on "Spectrum Modification by Active Control in Vibrating Structures"** (with V.K. Singh of Miami University, Ohio, Yitshak Ram of Louisiana State University, and John Mottershead of Liverpool University, England, Submitted to NSF).
2. **National Science Foundation Grant on "Collaborative Research on Quadratic Inverse Eigenvalue Problems in Science and Engineering: Theory and Computations, 2005-2009** (with Moody Chu of North Carolina State University).

3. **US department of Education Grant on “Active Vibration and Noise Control**, through “*Vibration and Acoustic Center*”, Northern Illinois University, 2004-2006.
4. **National Science Foundation Grant on “Computational Methods for Feedback Control Problems of Matrix Second-Order and Distributed Parameter Systems”**, 2000-2004.
5. **Wolfram Research Inc.** Grant “*Numerical Linear Control Library*,” 1998-2000.
6. **Boeing Company Grant** for Visiting Research Scientist, Summer, 1997.
7. **National Science Foundation Grant on “Large-Scale and Parallel Matrix Computations in Linear Control”**, 1993–1996.
8. **Air Force Office of Scientific Research Grant**, *Sequential and Parallel Matrix Computations* (1983–84, 1984–85, 1985–86).
9. **National Science Foundation Block Travel Grant** (administered by *IEEE Control Systems Society*), to participate at the IEEE Award ceremony in IEEE Conference on Decision and Control, Sydney, 2000.
10. **Chilean Research Council (CONYCET) Grant** for scientific advising and giving two one-hour invited talks at the *Chilean Congress of Applied Mathematics*, August, 2000.
11. **Chilean Research Council (CONYCET) Grant** for attending and giving two one-hour invited talks at the *Chilean Summer School on Numerical Linear Algebra*, January, 1999.
12. **Brazilian Research Council** (offered by state foundation of the state of São Paulo) Grant to participate, as an advisor, at the research project “*Large-scale Solutions of Matrix Equations Problems*,” State University of Campinas, Brazil, 1998.
13. **Brazilian Research Council (CNPQ) Grant** to attend and give an invited one-hour talk at the *Panamerican Conference on Applied and Computational Mathematics*, Gramado, Brazil, September, 1997.
14. **Chilean Research Council (CONYCET) Grant** for attending and giving two one-hour invited talks at the *Chilean Congress of Applied Mathematics*, Antofagasta, Chile, and International Conference on Control and Applications, July/August, 1997.
15. **Portuguese Research Council Grant** for attending and delivering three one-hour invited talks at the Int. *Summer School on Matrix Stability*, Lisbon, Portugal, June, 1997.
16. **National Research Council of Canada (NRC) Grant** to participate and give an invited talk at the *International Linear Algebra Society Conference on Computational Methods for Control, Systems, and Signals*, Manitoba, May, 1997.
17. **IEEE Control System Society Travel Grant** to attend the *IEEE Conference on Decision and Control*, Kobe, Japan (NSF Block Grant), 1996.
18. **Chilean Research Council Grant (CONYCET)** for short-term visit and lectures at *Universidad Catolica del Norte*, Antofagasta, Chile, May-June, 1996.
19. **Brazilian Research Council (CNPQ) Grant** for short-term visits and lectures at *Federal University of Rio de Janeiro*, and *Federal University of Rio Grande do Sul*, Porto Alegre, Brazil, June, 1996.
20. **NSF Block Grant** to participate at the *International Congress of Industrial and Applied Mathematics*, Hamburg, Germany, July, 1995.
21. **NSF Block Travel Grant** to participate at the *International Federation of Automatic Control Conference*, Sydney, Australia, 1993.

22. **Office of Naval Research Grant** to participate at the *International Conference on Numerical Linear Algebra and Applications*, Shanghai, October 1992.
23. **United Nations Development Grant** to participate at the *IMACS International Conference on Mathematical Modeling and Scientific Computing*, India, December 1992.
24. **Office of Naval Research Travel Grant** to participate at the *International Conference on Mathematical Theory of Networks and Systems*, and to visit several Japanese Universities, June 1991.
25. **United Nations Development Program Grant for scientific advising to the Government of India**, Summer 1991.
26. **Distinguished Visiting Research Scientist Grant** from Centro Nacional de Pesquisa (CNP) of Brazil, August 1990.
27. **Distinguished Visiting Research Scientist Grant** from the Government of Spain, June 1990.
28. **NSF Grant** for purchasing computing equipment VAX (CO-investigator), MCSA 82-05418.
29. **NSF Block Grant** to participate at the IEEE Conference on Decision and Control, 1987.
30. **Northern Illinois University Summer Grant**, 1981.
31. **Northern Illinois University Graduate School Grant** from the Dean's Fund, 1987.
32. **Research Foundation of the State of Sao Paulo, Brazil**. "Some Problems of Inertia and Stability," (Brian Cain, co-investigator), July–August 1980.
33. **National Research Council of Brazil**, travel ticket and living allowances for one week to attend Annual Meetings of the American Mathematical Society, January 1980.
34. **National Research Council of Brazil**, contract no. 40/0475/80 (Graciano de Oliveira, co-investigator), 1980.
35. **Research Foundation of the State of Sao Paulo, Brazil**, contract no. 539/80 (Hans Schneider, co-investigator), Controllability and Nonsingularity of Matrices, July–August 1980.
36. **Research Foundation of the State of Sao Paulo, Brazil** (Brian Cain, co-investigator), Stability and Inertia, July–August 1980.
37. **Research Foundation of the State of Sao Paulo, Brazil**, contract no. 79/0909. "Matrix Equation $SA + A^*S + S^*B^*BS$."
38. **Research Foundation of the State of Sao Paulo, Brazil**, contract no. 78/0490, "Stability and Other Criteria of Root-Locations," (David Carlson, co-investigator), July–September 1978.
39. **National Research Council of Brazil**, November 1978.
40. **United Nations Atomic Energy Commission**, travel ticket and living allowances for three weeks to attend Autumn Course on System Analysis, Trieste, Italy, November 1978.

PUBLICATIONS:

Books

1. **Numerical Linear Algebra and Applications**, Brooks and Cole Publishing Company, 1995. (*Second Edition to be published by the Society for Industrial and Applied Mathematics, 2008.*)

2. **Numerical Methods for Linear Control Systems Design and Analysis**, Elsevier Academic Press, 2003.
3. **Linear Algebra in Signals, Systems and Control** (Editor), SIAM (Society for Industrial and Applied Mathematics), 1988.
4. **Linear Algebra and its Role in Systems Theory** (Editor), AMS (American Mathematical Society), Contemporary Mathematics Series, Volume 47, 1985.
5. **Control in the Twenty-First Century** (Editor), Birkhauser, Boston, 1996.
6. **Applied and Computational Control, Signals and Circuits, Vol. 1**, Birkhauser, Boston, 2001; **Vol. 2**, Kluwer Academic Publisher, 2001.
7. **Control of Vibration and Structures with Modern Computational Methods** (with Y. Ram), in preparation.
8. A monograph on **Inertia, Stability, and Distance to Stability**, in preparation.
9. **Numerical Methods for Scientists and Engineers**, in preparation.

Scientific and Engineering Software

1. **Control System Professional-Advanced Numerical Methods** (with D. Sarkissian), Wolfram Research, Inc., 2003 for *industrial applications, research and classroom use for control education*. (The software has been developed with a grant from Wolfram Research, Inc., and is based on my book “*Numerical Methods for Linear Control Systems Design and Analysis*.”) **February, 2003**.
2. **MATCONTROL**- A MATLAB-based Toolbox implementing the major Algorithms in the book “*Numerical Methods for Linear Control Systems Design and Analysis*,” **(for class-room use)**.

Invited Workshops

Workshop on “*The State-of-the-Art Numerical Methods and Software for Computer-Aided Control Systems Design and Analysis*” at

- IEEE Conference on Control Applications and Computer-Aided Control Systems Design, Taipei, Taiwan, September, 2004.
- 5th Asian Control Conference, Melbourne, Australia, August, 2004.
- Universidad Central de Venezuela, Caracas, Venezuela, November, 2005.
- University of Aveiro, Aveiro, Portugal, December, 2005.
- Indian Institute of Technology, Kharagpur, India, January, 2005, and January 2006.
- *IEEE Conference on Decision and Control*, December, 2005. **(Organized by IEEE)**.

Refereed Publications

2003-2008

1. The global Arnoldi process for solving large-scale Sylvester-Observer equation arising in control (with Khalide Jbilou and M. Heyouni), submitted to **Numerical Linear Algebra with Applications**.

2. A symmetry preserving alternate projection method for finite-element model updating (with Joali Moreno and Marcos Raydan), the special issue on "Inverse Problems of the journal **Mechanical Systems and Signal Processing**, vol. 23 (2009), 1784-1791.
3. Spillover phenomenon in quadratic model updating (with M. Chu, W.W. Lin, and S.Xu), Accepted for publication in **American Institute of Aeronautics and Astronautics (AIAA) Journal**.
4. An optimization approach for minimum norm and robust quadratic eigenvalue assignment problems for vibrating structures (with S. Brahma), To appear in **Journal of Sound and Vibration**, Vol. 324 (2009), 471-489.
5. A norm-minimizing parametric algorithm for quadratic partial eigenvalue assignment via Sylvester equation (with S. Brahma), *Proceedings of the IEEE European Control Conference*, 2007, 490-496 (The associated paper has been submitted to **Numerical Linear Algebra with Applications**).
6. Model updating and simulation of Lyapunov exponents (with V. Yatsenko and S. Nair), **Proceedings of the IEEE European Control Conference**, 2007, 1094-1100.
7. Finite Element Model Updating: A close-look at the computational aspects of direct methods, **Proceedings of XXIV International Modal Analysis Conference**, 2006 (Invited). (DELETE THIS ONE).
8. A direct Method for model Updating with incomplete measured data and without spurious modes (with J. Carvalho, A. Gupta, and M. Lagadapati), **Mechanical Systems and Signal Processing**, vol.21 (2007), 2715-2731.
9. Zero assignment in vibration: with and without time delay (with Kumar Singh and Mayanak Tiyaqi), **Proceedings of the ASME (American Society of Mechanical Engineers 2007 International Design Engineering Technical Conference and Computers and Information in Engineering Conference, 2007**.
10. An optimization technique for damped model updating with measured data satisfying quadratic orthogonality constraint (with S. Deng, V. Sokolov and D.r. Srakissian), To appear in the Special Issue on "Inverse Problems" of the Journal **Mechanical Systems and Signal Processing**
11. Symmetry preserving eigenvalue embedding in finite-element model updating of vibrating structures, **Journal of Sound and Vibration** , Vol 1, 2006, PP. 1-26. (with J. Carvalho, W. Lin, and C.S. Wang)
12. Robust partial pole assignment in vibrating structures with aerodynamics effects (with W. W. Lin and J.N. Wang), **IEEE Transactions on Automatic Control**, vol.51, 2006, pp. 1979-1984.
13. Vector and Matrix Norms, Error Analysis, Efficiency and Stability (with R. Byers), A BOOK CHAPTER in **Handbook of Linear Algebra**, CRC Press, 2006.
14. An LMI-technique for stability and stabilization of Discrete-time Control Systems(with B. Sulikowski and K. Galkowski), **Proceedings of Mathematical Theory of Networks and Systems**, 2006, 810-815.
15. Finite element methods for model updating and partial eigenvalue assignment in structural dynamics, *Proceedings of International Conference on Modeling and Applications* (Invited Paper), Vilnius, Lithuania, 2005.
16. Krylov subspace methods for large-scale matrix problems in control, Special issue on *Structural Dynamical Systems in Linear Algebra* of the Journal **Future Generation of Computer Systems** (An Invited paper), vol. 19 (2003), pp. 1253-1263..

17. Robust and minimum-norm pole-assignment in vibrating structure with aerodynamics effects (with W. Lin and J.N. Wang) **Proc. IEEE Conference on Decision and Control**, Maui, Hawaii, Dec. 2003, pp.2358-2363.
18. Numerical methods for partial eigenvalue and eigenstructure assignment in vibrating structures (with D. Sarkissian), **Proc. IEEE 11th Mediterranean Conference on Control and Automation**, 2003. (DELETE THIS ONE).
19. Inverse eigenvalue problems for Quadratic matrix pencils arising in vibration and control, (with J. Carvalho) proceeding of the **12th Mediterranean Control Conference**, Kusadasi, Turkey, June 2004. (DELETE THIS ONE).
20. A new block algorithm for generalized Sylvester-observer equation and applications to state estimation of vibrating system, (with J. Carvalho) Proceeding of the *43rd IEEE Conference on Decision and Control*, pp. 3613-3618, 2004 (The associated paper submitted to **Numerical Linear Algebra with Applications**).
21. An Arnoldi-based divide and Conquer algorithm for discrete Sylvester equation (with W. Peng) Proceedings of the 2nd *IFAC Symposium on System, Structure, and Control*, pp. 90-95, 2004.

2001-2002

22. Finite-element model updating, eigenstructure assignment and eigenvalue embedding for vibrating structures, The special issue on **Vibration Control** (as an **invited paper**) in *Mechanical Systems and Signal Processing*, 2002, vol 16, no 1, 83-96.
23. Feedback control in distributed parameter gyroscopic systems: A solution of the partial eigenvalue assignment problem (with D. Sarkissian), The special issue on **Vibration Control** (as an **invited paper**) in *Mechanical Systems and Signal Processing*, 2002, vol 16 , no 1 , 3-17.
24. An algorithm for reduced order state estimation of descriptor systems (with J. Carvalho), **Proceedings of IEEE Conference on Decision and Control**, (2002), 3021-3026.
25. Spectral modification for gyroscopic systems (with D. Sarkissian and Y. Ram), **ZAMM** (Z. Angew Math. Mechanics), Vol. 82 (2001), 191-200.
26. Computational methods for feedback control in damped gyroscopic second-order systems (with D. Sarkissian) **Proceedings of IEEE Conference on Decision and Control**, (2002), 4456-4461. (DELETE THIS ONE).
27. A computational method for feedback control in distributed parameter systems (with D. Sarkissian), **Proceedings of the 8th IEEE International Conference on Methods and Models in Automation and Robotics, Szczecin, Poland, 2002**. (DELETE THIS ONE)
28. Theory and computations of some inverse eigenvalue problems for the quadratic pencil, (with D. Sarkissian), **Contemporary Mathematics** Volume “*Structured Matrices in Operator Theory, Control, and Signal and Image Processing*,” American Mathematical Society (2001), 221-240.
29. Partial eigenvalue assignment in linear systems : Existence, uniqueness and numerical methods (with D. Sarkissian), **Proceedings of the International Conference on Mathematical Theory of Networks and Systems**, 2002.
30. A block algorithm for multi-input eigenvalue assignment problem (with J. Carvalho), **Proc. International Federation on Automatic Control Conference** on “Systems and Structure,” (2001) ...
31. A block algorithm for the Sylvester-observer equation arising in state estimations (with J. Carvalho), **Proc. IEEE Conference on Decision and Control**, (2001), 3898-3903.

2000

32. Partial eigenstructure assignment for the quadratic pencil (with S. Elhay, Y. Ram, and D. Sarkissian), **Journal of Sound and Vibration**, Volume 230 (2000), 101-110.
33. Block algorithms for state estimation and functional observers, *Proc. IEEE 2000 Joint Conference on Control Applications & Computer-Aided Control Systems Design*, 19-23.
34. Single-input partial pole-placement for gyroscopic operator pencil (with Y. Ram and D. Sarkissian), **Proc. Mathematical Theory of Networks and Systems**, 2000.
35. Multi-input partial pole-placement for undamped gyroscopic distributed parameter systems (with Y. Ram and D. Sarkissian), **Proc. IEEE Conference on Decision and Control**, 2000 , 4661-4665

1999

36. Large-scale matrix computations in control, **Applied Numerical Mathematics**, Vol. 30 (1999),53-63.
37. Recent developments on nonmodal and partial modal approaches for control of vibration, **Applied Numerical Mathematics**, Vol. 30 (1999), 41-52.
38. Stability and Inertia, **Lin. Alg. Appl.** (special issue to honor Hans Schneider), (1999) 302/303, 563-600.
39. Multi-input partial eigenvalue assignment for the symmetric quadratic pencil (with D. Sarkissian), **Proc. American Control Conference** (1999),2244-2247
40. Numerical Linear Control Library–A Mathematica-based integrated Environment with Modern Control Algorithms, **Proc. IEEE International Symposium on Computer Aided Control Systems Design** (1999), 91-96.

1998

41. Single-input eigenvalue assignment algorithms: A close-look (with Mark Arnold), **SIAM J. Matrix Anal. Appl.**, Vol. 19 (1998) 447-467.

1997

42. Orthogonality and partial pole assignment for the symmetric definite quadratic pencil (with S. Elhay, and Yitshak Ram), **Lin. Alg. Appl.** (1997), 29-48.
43. Krylov Subspace methods in Control: An overview, **Proc. 36th IEEE Conference on Decision and Control** (*Invited paper*), IEEE Press, Piscataway (1997)), 3844-3848.. (DELETE THIS).
44. Generalized Arnoldi methods for the Sylvester-observer matrix equation and the eigenvalue assignment problem (with C. Hetti), **Proc. 36th IEEE Conference on Decision and Control** (*Invited paper*), IEEE Press Piscataway (1997), 4379-4383.
45. Parallel algorithms for certain matrix computations (with B. Codenotti, K. Datta, and M. Leoncini), **Theoretical Computer Science** 180 (1997), 287-308.
46. An Arnoldi method for the Sylvester-observer matrix equation (with C. Hetti), **Proc. European Control Conference** (1997) (*Invited paper*). (DELETE THIS ONE).

1996

47. A parallel algorithm for the Sylvester-observer equation (with Chris Bischof and A. Purkayastha), **SIAM J. Scientific Computations**, vol. 17, No. 3 (1996), 686-698.
48. Numerically robust pole assignment for second-order systems (with Eric Chu), **Int. J. Control**, vol. 64, No. 4 (1996), 1113-1127.
49. Numerical methods for linear control systems (with Daniel Boley), *A book chapter in Systems and Control in the Twenty-First Century*, Birkhauser, (1996), 51-74.
50. An algorithm for the partial multi-input pole assignment of a second-order control system (with S. Elhay and Y. Ram), **Proc. Conference on Decision and Control**, (1996), 2025-2029.

1995

- 51. A parallel algorithm for the eigenvalue assignment problem in linear systems (with A. Bhaya and M. Coutinho), **Proc. Int. Conference on Control and Information**, (1995), 163-168 (*Invited paper*).
- 52. A parallel algorithm for the Lyapunov matrix equation (with Conrad Fernandes) **Proc. American Control Conference**, (1995), 4050-4054 (*Invited paper*).

1994

- 53. Linear and numerical linear algebra in control theory: Some research problems, **Lin. Alg. Appl.** (1994), vol. 197-198, 755-790.
- 54. Recent developments in large-scale and parallel matrix computations and their applications to linear control problems, *Invited Paper*, **Proc. IEEE Conference on Decision and Control**, (1994), 438-442. (DELETE THIS ONE).
- 55. On computing the frequency response matrix for large and sparse linear systems (with Samar Choudhary and M. Heroux). **Proc. International Aerospace Congress**, Moscow, August 1994 (*Invited paper*).

1993

- 56. Feedback stabilization of the second-order model: A nonmodal approach (with F. Rincón), **Lin. Alg. Appl.**, 188 (1993), 138-161.
- 57. High performance computing in control, **SIAM Book on Parallel Processing for Scientific Computing** (1993), 274-281.

1992

- 58. Large-scale and parallel computations in control: A Tutorial (An *invited paper*) in, **Proc. American Control Conference**, (1992), 137-141.

1991

- 59. Parallel Algorithms in Control Theory, **Proc. IEEE Conference on Decision and Control**, (1991), 1700-1704 (*Invited paper*).
- 60. Arnoldi methods for large Sylvester-like observer matrix equations and an associated algorithm for partial spectrum assignment (with Y. Saad), **Lin. Alg. Appl.** (dedicated to G. H. Golub, R. Varga and D. Young), vol. 154-156, (1991), 225-244.
- 61. On feedback-stabilization of the large second-order model (with F. Rincón), **Trans. Soc. for Computer Simulation**, vol. 8, no. 2 (1991), 99-108.

1990

- 62. Numerical algorithms for the eigenvalue assignment problem via observer matrix equations, **Proc. IEEE Conference on Decision and Control**, (1990).
- 63. An algorithm for the multi-input eigenvalue assignment problem (with Mark Arnold), **IEEE Trans. Auto. Control**, (1990), 1149-1152.
- 64. On canonical form and eigenvalue assignment (with K. Datta), **Lin. Alg. Appl.**, **13**, (1990), 161-182.

1989

65. Large scale and parallel matrix computations in control: some ideas, *Lin. Alg. Appl.*, **12**, (1989), 243-364.
66. Bezoutian, Vandermonde matrices and the stability criterion of Lienard and Chipart (with Paul Fuhrman), *Lin. Alg. Appl.*, **120**, (1989), 23-37.

1988

67. Large scale solutions of Sylvester matrix equation and partial pole assignment problems (with Y. Saad), **Proc. 4th Int. Fed. Automatic Control Symposium on Computer-Aided Control Design**, Pergamon Books Ltd., 1988.

1987

68. An algorithm for assigning eigenvalues in a Hessenberg matrix: single-input case, *IEEE Trans. Auto. Control*, AC-32 (1987), 414-417.
69. The matrix equation $XA = A^T X$ and associated algorithms for inertia and stability problems (with K. Datta), *Lin. Alg. Appl.*, **97**, (1987), 103-119.
70. A Hessenberg method for the positive semidefinite Lyapunov equation (with K. Datta), **Proc. 26th IEEE Conference on Decision and Control** (1987).

1986

71. Toeplitz algorithms for controllability, GCD and Cauchy Index (with K. Datta), **Proc. American Control Conference** (1986), 415-418. (*Invited paper*)
72. On determining eigenvalue distribution of a matrix in certain regions of the complex plane (with K. Datta), *IEEE Trans. Auto Control*, AC-31 (1986), 445-447.
73. Review of matrices and indefinite scalar products, *Lin. Alg. Appl.*, **74**, (1986), 277-279.
74. On the root separation of polynomials and inertia theory for matrices (*invited paper*), **Proc. 25th IEEE Conference on Decision and Control**. (1986), 1959-1962.
75. Theoretical and computational aspects of some linear algebra problems in control theory (with K. Datta), **Computational and Combinatorial Methods in Systems Theory** (1986), 202-212. Edited by C. Byrnes and A. Lindquist (*Invited paper*).

1985

76. Efficient parallel algorithms for controllability and eigenvalue assignment problems (with K. Datta), **Proc. 24th IEEE Conference on Decision and Control**, (1985), 1611-1616. (DELETE THIS ONE).
77. Sequential and parallel computations and complexities for determining relative primeness, stability and inertia (with K. Datta), *Contemporary Mathematics*, vol. 47 (Special issue on *Linear Algebra and its Role in Systems Theory*) (1985), 95-109, American Math. Society.

1984

- 78. An analysis and synthesis of classical Fujiwara-methods for the root-separation problem, **J. Math. Anal. Appl.**, vol. 98, (1984), 495-501.
- 79. Stability and controllability, **Int. Journal of Control**, vol. 38, (1984), 1013-1022.
- 80. A new criterion of controllability, **IEEE Trans. Auto. Control**, AC-29 (1984), 444-446.
- 81. On the controllability of matrix pairs (A, K) with K positive semidefinite (with D. Carlson and H. Schneider), **SIAM J. Algebraic and Discrete Methods**, vol. 5, (1984), 346-350.
- 82. Generalized Hankel matrices of Markov parameters and their applications in control problems, **Lin. Alg. Appl.**, 62, (1984), 139-154.

1983

- 83. A fast solution method for positive semidefinite Lyapunov matrix equation (with K. Datta), **Proc. 2nd Latin American Conference in Applied and Computational Mathematics**, Rio de Janeiro, Brazil, 1983.

1982

- 84. On the structure of the unique solution to a Lyapunov matrix equation, **SIAM Review**, July 1982.
- 85. A solution of the unit circle problem via Schwarz canonical form, **IEEE Trans. Auto. Control**, AC-27 (1982), 698-700.
- 86. A semi-definite Lyapunov Theorem and characterization of tridiagonal-stable matrices (with D. Carlson and C. Johnson), **SIAM J. Alg. Ddiscrete Methods**, vol. 3, (1982), 293-304.

1980

- 87. An algorithm for computing commuting matrices with applications, **Matrix and Tensor Quarterly**, vol. 30, (1980), no. 2, 114-115.
- 88. On the computation of the characteristic polynomial of a Hessenberg matrix, **Journal of Industrial Mathematics Soc. (USA)**, vol. 30, part 1, (1980), 55-60.
- 89. Controllability, Bezoutian and relative primeness, **Inter. J. Math. and Math. Sc. (USA)**, vol. 3, no. 1 (1980), 185-188.
- 90. Matrix equations, polynomial matrix and the number of zeros of a polynomial inside the unit circle, **Linear and Multilinear Algebra (USA)**, vol. 9, (1980), 63-68.
- 91. A relationship between a Hankel matrix of Markov parameters and the associated matrix polynomial with some applications, **Czech. Math. Journal (Journal of the Czechoslovakia Academy of Mathematics)**, vol. 30, (1980), 71-79.
- 92. Application of the Bezoutian bilinear form to the solution of the aperiodicity problem, **Matrix and Tensor Quarterly**, vol. 30, no. 3, (1980), 76-80.

1979

- 93. On the effective computation of the inertia of a non-Hermitian matrix (with D. Carlson), **Numerische Matematik**, vol. 33, (1979), 315-322.

94. Application of the Hankel matrices of Markov parameters to the solutions of the Routh-Hurwitz and Schur-Cohn problems, **J. Math. Anal. Appl.** vol. 69, (1979), 276-290.
95. The Lyapunov matrix equations $SA + A^*S = S^*B^*BS$ (with D. Carlson), special issue of **Lin. Alg. Appl.** dedicated to A. Householder, vol. 28, (1979), 43-53.

1978

96. On the Routh-Hurwitz-Fujiwara and the Schur-Cohn-Fujiwara Theorems for the root-separation problems, **Lin. Alg. Appl.**, vol. 22, (1978), 235-246.
97. Stability and D-stability, **Lin. Alg. Appl.**, vol. 21, (1978), 135-141.
98. An elementary proof of the stability criterion of Lienard and Chipart, **Lin. Alg. Appl.**, vol. 122, (1978), 89-96.
99. Two inertia theorems for Hessenberg matrices and their applications to stability analysis of linear control systems, **Matrix and Tensor Quarterly**, vol. 29, (1978), 55-63.
100. Comments on application of Hankel matrix to the root-location problem, **IEEE Trans. Auto. Control**, June (1978).

1977

101. Matrices satisfying Siljak's conjecture, **IEEE Trans. Auto. Control**, AC-22 (1977), 132-133.

1976

102. An algorithm for computing powers of a Hessenberg matrix and its applications (with Karabi Datta), **Lin. Alg. Appl.**, vol. 14, (1976), 273-284.
103. An algorithm for computing symmetrizer of a Hessenberg matrix, published under the title "*Datta-Method*" in the book **Computer Based Numerical Algorithms** by E. V. Krishnamurthy and S. K. Sen, Van-Nostrand East and West Press, 1976, 261-263.
104. A numerical method for solving the stability equations (with K. Datta), **Proc. Symposium on Computer Systems, Organization and Programming**, University of Calcutta, Calcutta, India, 1976.
105. Application of Hankel matrix to the root-location problem, **IEEE Trans. Auto. Control**, AC-21 (1976), 611-612.

1975

106. On the computation of the Routh canonical form of a Hessenberg matrix, **IEEE Trans. Auto. Control**, AC-20 (1975), 273-275.
107. An inertia theorem for Schwarz matrix, **IEEE Trans. Auto. Control**, AC-20 (1975), 274-275.
108. On the similarity between a matrix and its Routh-canonical form, **IEEE Trans. Auto. Control**, AC-20 (1975), 233-274.

1974

109. A constructive method for finding the Schwarz from of a Hessenberg matrix, **IEEE Trans. Auto. Control**, AC-19 (1974), 616-617.

1973

110. Matrix equation and relative primeness of two polynomials, **IEEE Trans. Auto. Control**, AC-13 (1973).

1972

111. The DAD theorem for non-negative symmetric matrices (with J. Csima), **Combinatorial Theory**, Serie A, 12 (1972), 147-152.

Newsletter Articles (only a few listed)

1. **SIAM Newsletter**
March 1993, September 1992, July 1992, March 1991, ... 1988, January 1987
2. **IMAGE**, newsletter of the International Linear Algebra Society
August 1992, ...
3. **Linear Algebra and Applications 13** (1990), 277-279

INVITED COLLOQUIUM TALKS

1. Universite' de Valenciennes, Valenciennes, France, May, 2008 (TWO TALKS).
2. Kiev State University, Ukraine, June, 2008.
3. **Ternopil Technical University**, Ukraine, June, 2008 (A WORKSHOP consisting of THREE Lectures and TWO Technical Talks).
4. **Indian Institute of Technology, Kharagpur, India**, July, 2008. **Menoufia University**, Cairo, Egypt, December, 2008 (A WORKSHOP consisting of THREE Lectures and THREE Technical Lectures).
5. **Universite Hassan II**, Casablanca, Morocco, Februray, 2008.
6. **Universite du Littoral** Calais, France, May, 2007.
7. **University of Athens**, Athens, Greece, June, 2007.
8. **National Technical University of Greece**, Athens, Greece, June, 2007.
9. **Fudan University**, Shanghai, China, July, 2007.
10. **Malaysian University of Science and Technology**, Penang, Malaysia, August, 2007.
11. **Xiamen University**, Xiamen, Xhina, Augsut, 2007.
12. **University of Kentucky**, Lexington, Kentucky, USA., April, 2006.
13. **National University of Mongolia** , Ulan Bator, Mongolia, May, 2006.
14. **Peking University** , Beijing, China, June, 2006.

15. **Hong Kong Polytechnique University**, Hong Kong, June, 2006.
16. **University of Hong Kong**, June, 2006.
17. **City University of Hong Kong** , June, 2006.
18. **Xian University**, Xian, China, June, 2006
19. **Kaunas Technical University, Kaunas, Lithuania**, June, 2005
20. **The Boeing Company, Seattle**, November, 2005.
21. **Kent State University, Kent, Ohio**, October, 2005
22. **Universidad Central de Venezuela, Caracas, Venezuela**, November, 2005.
23. **Universidad de Aveiro, Aveiro, Portugal**, December, 2005
24. **Universidad de Lisboa, Lisbon, Portugal**, December, 2005
25. **University of Connecticut, Storrs, Connecticut**, April, 2004.
26. **Florida State University, Computer Science Department**, Tallahassee, Florida, March, 2004.
27. **Istanbul Technical University, Istanbul, Turkey**, May 2004.
28. **Bilkent University, Electrical Engineering Department**, Ankara, Turkey, May 2004.
29. **Dokuz Eylol University, Electrical Engineering Department**, Izmir, Turkey, June 2004.
30. **National Taiwan University**, Taipei Taiwan, August 2004.
31. **Polytechnic University of Hong Kong**, Hong Kong, September, 2004.
32. **University of Adelaide**, Adelaide, South Australia, July 2004.
33. **University of Tasmania**, Hobart, Tasmania Australia, July 2004.
34. **New Zealand Power Systems Company**, Wellington, New Zealand, July 2004.
35. **Tsing Hua University**, Hsinchu, Taiwan, January 2003.
36. **National Taiwan University**, Taipei, January 2003.
37. **Hong Kong Polytechnic University**, Hong Kong, January 2003.
38. **University of Hong Kong**, Hong Kong, (Mechanical Engineering Department), January 2003.
39. **City University of Hong Kong**, Hong Kong, February 2003.
40. **Indian Institute of Technology**, Kharagpur, India, February 2003.
41. **Federal University of Rio de Janeiro**, Brazil, April, 2003. (Electrical Engineering Dept).
42. **Federal University of Rio Grande de Norte**, Natal, Brazil, April, 2003 (Electrical Engineering Department).
43. **Federal University of Santa Catarina**, Florinaopolis, Brazil, May, 2003.
44. **State University of Sao Paulo, Brazil**, May, 2003.
45. **Federal University of Rio Grande do Sul**, Brazil, May, 2003.
46. **University of Florida, Ganesvile,Florida**, May, 2003.

47. **State University of St. Petersburg** , St. Petersburg, Russia, June 2002.
48. **University of Arkansas**, Fayetteville, April, 2002.
49. **National Center for Theoretical Studies (NCTS), Tsing Hua University**, Taiwan, June 2001.
50. **Monash University**, Melbourne, Australia, December 2000.
51. **Louisiana State University**, Mechanical Engineering Department, Baton Rouge, USA, February, 2000.
52. **University of Concepcion**, Concepcion, Chile, August 2000.
53. **IEEE sponsored** one-hour invited talk at Electrical Engineering Department, **Indian Institute of Technology, Kharagpur**, India, January, 1999.
54. **Technical University of Valparaiso**, Valparaiso, Chile, December, 1999.
55. **University of Iqueque**, Iqueque, Chile, December, 1999.
56. **University of Florida**, October, 1998.
57. **University of Adelaide**, Adelaide, Australia, Dept. of Computer Science, August, 1998.
58. **University of the South Pacific**, Dept. of Mathematics, Fiji, August, 1998.
59. **University of Wisconsin-Madison**, April, 1997.
60. **University of Osaka**, Department of Electrical Engineering, Dec, 1996.
61. **National University of Engineering**, Lima, Peru, August, 1997.
62. **Federal University of Cuzco**, Cuzco, Peru, August, 1997.
63. **University of Illinois at Urbana-Champaign**, Computer Science Department and Computational Science and Engineering Program, November 1996.
64. **Universidad Catolica del Norte**, Antofagasta, Chile, June 1996.
65. **Universidade Federal do Rio Grande do Sul**, Porto Alegre, Brazil, June 1996.
66. **Universidade Federal do Rio de Janeiro**, Rio de Janeiro, Brazil, June 1996.
67. **AT&T Bell Laboratories**, Computer Science Department, Murray Hill, NJ, August, 1995.
68. **University of Oldenburg**, Dept. of Physics, Oldenburg, Germany, June, 1995.
69. **Indian Institute of Technology Kharagpur**, India, July, 1995.
70. **Research Centre for Tata Research and Development Corporation**, Pune, India, July, 1995.
71. **University of Auckland, Auckland, New Zealand**, Department of Mathematics and Statistics, November 29, 1994.
72. **University of Western Australia**, December 9, 1994.
73. **University of Puerto Rico at Rio Peidras**, March, 1994.
74. **University of Puerto Rico at Mayaguez**, March, 1994.
75. **CRAY Research Corporation, Minnesota**, May, 1993.
76. **Australian National University**, Canberra, Australia, Computer Science Department, July, 1993.

77. **University of Adelaide**, Adelaide, Australia, July, 1993.
78. **Flinders University of South Australia**, July, 1993.
79. **University of Buenos Aires**, Argentina, Buenos Aires, May, 1993.
80. **University of Chile**, Santiago, Chile, May, 1993.
81. **Catholic University of Antofagasta**, Chile, May, 1993.
82. Two talks on Numerical Linear Algebra and Applications at **Indian Institute of Management**, Calcutta, India, December 1992.
83. **Wichita State University**, Computer Science Department, May 1992.
84. **University of Tokyo**, Tokyo, Japan, June 1991.
85. **Tokyo Denki University**, Tokyo, Japan, June 1991.
86. **Hong Kong Polytechnic University**, July 1991.
87. **Indian Institute of Science**, Bangalore, India, July 1991.
88. **Indian Institute of Technology**, Kharagpur, India, July 1991.
89. **University of Hong Kong**, July 1991.
90. **National University of Singapore**, August 1991.
91. **Boeing Computer Services**, October 1991.
92. **Argonne National Laboratory**, May 1990.
93. **University of Wisconsin-Madison**, April 1990.
94. **Ohio State University**, April 1990.
95. **North Carolina State University**, Raleigh, North Carolina, March 1990.
96. **College of William and Mary**, Virginia, March 1990.
97. **ICASE (NASA Langley Research)**, March 1990.
98. **Polytechnic University of Valencia**, June 1990.
99. **Free University**, Amsterdam, The Netherlands, June 1990.
100. **University of Twente**, The Netherlands, June 1990.
101. **Federal University of Rio de Janeiro**, August 1990.
102. **National Laboratory for Scientific Computing**, Rio de Janeiro, Brazil, August 1990.
103. **State University of Campinas**, Campinas, Brazil (an invited short course), August 1990.
104. **Washington University**, St. Louis, December 1989. July 1989
105. **Polytechnic University of Valencia**, Spain, (several talks), June-July 1989.
106. **Polytechnic University of Madrid**, Madrid, Spain, July 1989.
107. **Tokyo Denki University**, Tokyo, Japan, two colloquium talks on Large Scale and Parallel Matrix Computations and their Applications to Control and Systems. September 1988.

108. **IEEE Control Systems Society**, Tokyo Chapter, Tokyo Japan, September 1988.
109. **Hokkaido University**, Sapporo, Japan, Dept. of Mathematics, September 1988.
110. **Tokyo Institute of Technology**, Tokyo, September 1988.
111. **San Diego State University**, Dept. of Mathematical Sciences, San Diego, California, April 1988.
112. **Santa Clara University**, Dept. of Electrical Engineering, May 1988.
113. **Indian Institute of Technology**, Dept. of Electrical Engineering, Kharagpur, India, August 1988.
114. **Academia Sinica**, (The Chinese Academy of Sciences), Institute for Systems Sciences, August 1988.
115. **East China Normal University**, Dept. of Mathematics, Shanghai, China (two talks), August 1988.
116. **Fudan University**, Dept. of Mathematics, Shanghai, China (two talks), August 1988.
117. **Indian Institute of Science Computer Center**, Bangalore, India (a series of three lectures), July 1988.
118. **National Aeronautical Laboratory**, Division of Computer Science, Bangalore, India, July 1988.
119. **University of Illinois**, Center for Supercomputing Research Development (CSRD), May 1987.
120. **University of Belgrade**, Department of Mechanical Engineering, (Control Engineering Group), a series of two lectures at, Belgrade, Yugoslavia, July 1987.
121. **Jadavpur University**, Division of Control Engineering and Department of Electrical and Mechanical Engineering (joint seminar), July 1987.
122. **University of Bielefeld**, Department of Mathematics, Bielefeld, West Germany, June 1987 October 1987.
123. A series of talks on *Large Scale and Parallel Matrix Computations in Control* at Numerical Analysis Seminar of the **University of California-San Diego**, La Jolla, September-October 1987.
124. **Athens School of Economics and Business Studies**, Athens, Greece, December 1986.
125. **Israel Institute of Technology**, Haifa, Israel, December 1986.
126. **Tel-Aviv University**, Department of Mathematics and the Department of Electrical Engineering, Tel-Aviv, December 1986.
127. **Ben Gurion University of the Negev**, Beer Sheva, Israel, December 1986.
128. **University of Wisconsin-Madison**, Matrix Theory Seminar, October 1986.
129. An invited short course on Large Scale and Parallel Matrix Computations and their applications to several control problems Polytechnic **University of Valencia**, Spain, December 1986.
130. **Kent State University**, April 1985.
131. **University of Illinois at Urbana-Champaign**, Dept. of Computer Science, February 1985.
132. **Indian Statistical Institute**, Calcutta, India, July 1985.
133. **Yale University**, Research Center for Scientific Computation, November 1985.
134. **Texas A M University**, Department of Electrical Engineering, April 1984.
135. **University of Wisconsin-Madison**, Department of Mathematics, October 1982.

136. **Georgia State University**, Department of Mathematics, Atlanta, April 1980, February 1981.
137. **Northern Illinois University**, Seminar on Numerical Analysis and Optimization, several talks, 1981.
138. **Pennsylvania State University**, Department of Computer Science, March 1981.
139. **Drexel University**, Philadelphia, February 1981.
140. **California State University, Fullerton**, Department of Mathematics, Fullerton, California, April 1980.
141. **California State Polytechnic University**, Department of Mathematics, Pomona, California, October 1980.
142. **University of Maryland**, Numerical Analysis Laboratory, January 1980.
143. **Southern Illinois University**, Carbondale, Illinois, Department of Mathematics (several talks in Numerical Analysis Seminar), January-May 1980.
144. COPPE, **Universidade Federal do Rio de Janeiro**, August 1977, September 1979.
145. **International Centre for Theoretical Physics**, Trieste, Italy, (two talks), November 1978.

MAJOR INVITED ADDRESSES

Key-Note and Plenary Lectures

1. **International Conference on Numerical Analysis and Scientific Computing**, Agadir, Morocco, May 17- May 19, 2009 (PLENARY). *Invitation Accepted*
2. **International Conference on Shape Optimization and Inverse Problems**, Nantes, France, December 17- December 21, 2008 (PLENARY)
3. **Mathematical Methods in Science and Engineering**, Poros, Greece, September 3 - September 5, 2009 (PLENARY). *Invitation Accepted*.
4. **Second International Conference on Control and Optimization**, Baku, Azerbaijan, June, 2008 (PLENARY).
5. **Latin American Workshop on Optimization and Control**, Quito, Ecuador, July, 2008 (PLENARY).
6. **Mexican National Conference on Systems and Computations**, September, 2008 (TWO KEY-NOTE).
7. **Second International Conference on Industrial and Information Systems**, Predaniya University, Sri Lanka, August, 2007 (KEY-NOTE).
8. **International Conference on Mathematical and Computational Methods in Science and Engineering**, Trinidad, November, 2007 (KEY-NOTE).
9. **International Workshop on Numerical Linear Algebra in Signals, Systems and Control**, Indian Institute of Technology, Kharagpur, India, January, 2007 (PLENARY).
10. **Hans Schneider 80th Birthday Conference**, University of Connecticut, Storrs, Connecticut, October, 2007 (PLENARY).
11. **Second International Conference on Dynamical Systems and Conference**, Mexico City, December, 2007 (PLENARY).

12. **Fourth National Conference on Systems and Computations**, Ixtapa, Mexico, December, 2007 (PLENARY).
13. **Workshop on Numerical Linear Algebra**, University of Athens, Athens, Greece, June, 2007 (PLENARY).
14. **Workshop on Numerical Methods for Control**, University of Athens, Athens, Greece, June, 2007 (PRINCIPAL LECTURER).
15. **International Conference on Structured matrix Computations**, Hong Kong, June, 2006 (PLENARY).
16. **International Congress of Applications of Mathematics**, Santiago, Chile, March, 2006 (PLENARY).
17. **International Conference on Mathematical Modeling and Applications**, Vilnius, Lithuania, June, 2005 (PLENARY).
18. **6th International Conference on Cooperative Control and optimization**, Florida, February, 2005 (PLENARY).
19. **IEEE NIU Rockvalley Annual Meeting (Principal Speaker)**, Northern Illinois University, DeKalb, Illinois, November, 2005.
20. **Special Year In Applied Mathematics at University of Florida**, Gainesville, Florida, March 2004 (PLENARY).
21. **International Conference on “Inverse Problems,”** Fethiye, June 2004 (PLENARY).
22. **Workshop on “Numerical Linear Algebra and Applications,”** University of Aristotle, Thessaloniki, Greece, June 2004 (PLENARY).
23. **8th IEEE International Conference on Methods and Models in Automation and Robotics**, Poland, September, 2002 (PLENARY).
24. **2nd International Conference on Nonlinear Dynamics**, Moscow, Russia, June, 2002 (PLENARY).
25. The WSEAS Conference on **Linear and Numerical Linear Algebra and Applications**, Poland, September, 2002 (PLENARY).
26. *Two one-hour lectures* at the **Summer School for Young Scientists**, Rostov on Don, Russia, June, 2002.
27. *Joint AMS/IMS/SIAM Summer Research Conference* on “**Fast Algorithms in Mathematics, Computer Science and Engineering**,” August, 2001 (PLENARY).
28. The International Conference on “**Optimization and Optimal Control**,” Taiwan, June 1-4, 2001 (PLENARY).
29. The **International Conference on Nonlinear Analysis and Modeling**, Turkey, July 2001 (PLENARY).
30. **Chilean Congress on Applied and Computational Mathematics**, La Serena, Chile, August, 2000 (PLENARY).
31. The AMS-IMS-SIAM Joint Summer Research Conference, “**Structured Matrix Computations**”, Boulder, Colorado, June, 1999 (PLENARY).

32. International Conference on “**Inverse Eigenvalue Problems,**” Antofagasta, Chile, Dec. 12-17, 1999 (KEY-NOTE).
33. *A series of one-hour Lectures* on “**Large-scale Matrix Computations**” at **Universidad Autonoma Metropolitana of Mexico,** Mexico City, Mexico, Dec. 11-18, 1998.
34. *Two one-hour talks* at the **Latin American Summer School in Applied Mathematics on Numerical Linear Algebra,** January, 1999.
35. “*Mathematical Journey through Analysis, Matrix Theory and Scientific Computation,*” Kent State University, Kent, Ohio (in honor of Richard Varga), 1998 (PLENARY).
36. **Pan American Conference on Applied and Computational Mathematics,** Gramado, Brazil, August, 1997 (PLENARY).
37. **International Conference on Control and Applications,** Antofagasta, Chile, August, 1997 (KEY-NOTE).
38. **Chilean Congress of Mathematics,** Antofagasta, Chile, July, 1997 (PLENARY).
39. *Three one-hour talks* at the **Int. Summer School on Matrix Stability,** Lisbon, Portugal, June, 1997.
40. *Two one-hour talks* at the **MAA (Mathematical Association of America) Spring meeting** at Pittsburgh State University Pittsburgh, Kansas, USA, March, 1997 (PRINCIPAL LECTURE).
41. *ODE to Linear Algebra and Rational Approximation,* Monterey, California, November 1-2, 1996 (in honor of William Gragg) (PLENARY).
42. **Second Conference of International Linear Algebra Society,** Lisbon, Portugal, August 1992 (PLENARY).
43. **IMACS International Symposium on Mathematical Modeling and Scientific Computing,** Bangalore, India, December 1992 (PLENARY).
44. **International Conference on Numerical Linear Algebra and Applications,** Shanghai, China, October 1992 (PLENARY).
45. **Householder Symposium,** Tylosand, Sweden, June 1990 (PLENARY).
46. **Inaugural Meeting on Matrix Theory and its Application of the International Linear Algebra Society,** Brigham Young University, Utah, August 1989 (PLENARY).
47. “Large Scale and Parallel Numerical Linear Algebra Techniques for Power Systems Problems” at the **Fourth IASTED Int. Conference on High Technology in the Power Industry** (Power High-Tech, 1989), July 1989, Valencia, Spain (KEY-NOTE).
48. *Inaugural one-hour Address* at the **International Summer School** on “Parallel Processing Applied to Control, Systems and Signal Processing,” Polytechnic University of Valencia, Spain, July 1989 (PLENARY).
49. **International Conference on Linear Algebra and its Applications,** Valencia, Spain, September 1987 (PLENARY).
50. *One half-hour talk* at the Conference, **Mathematics of Signal Processing and Control Conference,** Stanford University, August 1987 (PLENARY).
51. **Haifa Matrix Theory Conference,** Technion, Haifa, Israel, 1987 (PLENARY).

52. **Gatlinburg Numerical Linear Algebra Symposium**, University of Waterloo, 1984 (one-hour talk). (Attendance to this symposium is by invitation only and only a few selected number of mathematicians are invited to give a major invited talk) (PLENARY).
53. **International Conference on Linear Algebra and its Applications**, Coimbra, Portugal, 1983 (KEY-NOTE).
54. **Matrix Theory Conference**, Auburn, Alabama, 1980 (PLENARY).

Invited Special Sessions Lectures

1. **IEEE European Control Conference**, Kos, Greece, June, 2007(Invited Session Talk).
2. **IEEE Mediteranean Control Conference**, Athens, Greece, June, 2007.
3. **12th Mediterranean Conference on Control**, June 2004.
4. **American Mathematical Society Meeting**, University of Kansas, Lawrence, Kansas, March 2001.
5. **IEEE Conference on Decision and Control**, Sydney, Australia, December, 2000.
6. **IEEE Conference on Control Applications and Computer-Aided Control System Design**, Alaska, October, 2000.
7. **International conference on Mathematical Theory of Networks and Systems**, Perpignan, France, June, 2000.
8. **International Linear Algebra Conference** (honoring Hans Schneider), Madison, Wisconsin, 1998 (*Two minisymposia talks*).
9. **International Linear Algebra Society Conference** on “*Fast Algorithms for Control, Systems, and Signal Processing*,” Manitoba, Canada, May, 1997.
10. **35rd IEEE Conference on Decision and Control**, Kobe, Japan, December 1996.
11. **American Mathematical Society Meeting**, Orlando, FL, January 1996.
12. **33rd IEEE Conference on Decision and Control**, Lake Buena Vista, Florida, December 14-16, 1994.
13. **American Control Conference**, Seattle, June, 1995.
14. **International Congress for Industrial and Applied Mathematics**, Hamburg, Germany, July, 1995.
15. **International Conference on Applications of Control and Information**, Hong Kong, June, 1995.
16. **SIAM Conference on Linear Algebra in Signals, Systems, and Control**, Seattle, August 1993.
17. **AMS Meeting, Kent State University, Kent, OH**, 1995.
18. **AMS -MAA Joint Meeting , Orlando, FL**, 1996.
19. **SIAM Annual Meeting, Charlotte, N.C.**, 1995.
20. **SIAM Conference on Control and Applications, St. Louis, MI**, 1995.
21. **International Federation of Automatic Control Conference**, Sydney, Australia, 1993.

22. **SIAM Annual Meeting**, Los Angeles, CA, July 1992.
23. **American Control Conference**, Chicago, IL, August 1992.
24. **IEEE Conference on Decision and Control**, December 1991.
25. **International Symposium on Mathematical Theory of Networks and Systems**, June 1991.
26. **International Symposium on Mathematical Theory of Networks and Systems (MTNS '89)**, Amsterdam, June 1989.
27. ***SIAM Conference on Control in Nineties: Achievements and Opportunities***, San Francisco, May 1989.
28. **First International Conference on Industrial and Applied Mathematics**, (SIAM '87), Paris, July 1987.
29. **International Conference on Mathematics Theory of Networks and Systems (MTNS '87)**, June 1987.
30. **American Control Conference**, Seattle, 1986.
31. **25th IEEE Conference on Decision and Control**, Athens, Greece, December 1986.
32. **International Conference on Mathematical Theory of Networks and Systems**, Stockholm, Sweden, 1985.
33. **SIAM Fall Meeting**, 1983.

Short Courses and Tutorials

1. Workshop on “*The State-of-the-Art Numerical Methods and Software Design for Computer-Aided Control Systems Design and Analysis*,” International Federation on Automatic Control (**IFAC**) Conference on “Systems and Structure,” Oaxaca, Mexico, December 7, 2004.
2. Tutorial on “The State-of-the-Art Numerical Methods and Software for Computer-Aided Control Systems Design and Analysis,” *IEEE Conference on Control Applications and Computer-Aided Control Systems Design*, Taipei, Taiwan, September 1, 2004.
3. Workshop on “The State-of-the-Art Numerical Methods and Software for Control Systems,” *5th Asian Control Conference* (Sponsored by IEEE), Melbourne, Australia, August, 2004.
4. Short Course on “*Numerical Methods in Control, Signals, and Image Processing*,” SIAM Conference on Linear Algebra in signals, systems and control, Seattle, 1993.
5. Short Course on “*Numerical Methods for Control*,” Mathematical Theory of Networks and Systems (**MTNS**), St. Louis, June 1996.
6. A short course on *Numerical Methods for Linear Control Systems*, **International Conference on Mathematical Theory of Networks and Systems**, June, 1996.
7. *Modern Numerical Linear Algebra Techniques for Linear Control Systems Design and Analysis*, **Invited** short course delivered at **Federal University of Rio de Janeiro**, Brazil, and Universidad Catolica del Norte, Antofagasta, Chile, June 1996.
8. A short course on *Numerical Methods in Control, Signals and Image Processing*, **Third SIAM Conference on Linear Algebra in Signals, Systems and Control**, Seattle, August 1993.
9. A short course on *Large-Scale and Parallel Matrix Computation with Applications to Engineering*, **National Aeronautics Laboratory**, Bangalore, India, December 1992.
10. A short course on *Large-Scale and Parallel Matrix Computations with Applications to Power Systems and Control Problems*, Bangalore, India, December 1992.
11. A tutorial on *Large-Scale and Parallel Computations in Control*, **American Control Conference**, June 1992.
12. *Feature Tutorial Presentation* at **Permian Basin Supercomputing Conference**, Texas, March 1992.
13. A short course on *Large-Scale and Parallel Matrix Computations for Control Problems*, **Second SIAM Conference on Linear Algebra in Signals, Systems and Control**, San Francisco, November 1990.
14. A short course on *Large-Scale and Parallel Computations in Control*, **Polytechnic University of Valencia**, Valencia, Spain, 1986.
15. A short course on *Numerical Linear Algebra in Control*, **Tokyo Denki University**, Tokyo, Japan, 1988.

OTHER PROFESSIONAL INFORMATION:

Editorial Activities

Editor, *Numerical Linear Algebra with Applications*, 1997-.

Editor, *Mechanical Systems and Signal Processing*, 2006-.

Editor, *Computational Methods in Applied Mathematics*.

Editor, *Dynamics of Continuous, Discrete & Impulsive Systems (DCDIS-B)* .

Editor, *International Journal of Mathematics and Statistics*.

Editor, The Special issue “*Inverse Problems*” of the Journal, *Mechanical Systems and Signal Processing* (MSSP), 2007.

Editor, *Computational and Applied Mathematics*.

Editor, *Journal of Functional Analysis and Applications*.

Editor, *Journal of Spectral Mathematics and Applications*.

Editor-in-Chief “*Applied and Computational Control, Signal, and Circuits*” Birkhauser Publishing Co., Boston (1st Volume); Kluwer Academic Publisher, Boston (2nd Volume).

Special Editor of *Linear Algebra and its Applications* (published in honor of Hans Schneider), 1999.

Editor, *Systems and Control in the Twenty-First Century*, Birkhauser, Boston , 1996.

Editor, *SIAM J. Matrix Analysis and Applications*, 1989-1993.

Associate Editor, *J. Mathematical Estimation, Systems and Control Theory*, 1993-1996.

Special Editor, *Linear Algebra and Applications*, 1993.

Special Editor, of the **special issue** of *Numerical Linear Algebra with Applications on Numerical Linear Algebra Techniques for Control and Signal Processing*, 2001.

Editor, *Proyecciones (Chilean Journal of Mathematics)*.

CONFERENCE ORGANIZATION AND LEADERSHIP

1. **Chairman**, *The Society of Industrial and Applied Mathematics (SIAM) Conference on Linear Algebra in Signals, Systems, and Control*, Boston, August, 2001.
2. **Co-Chairman**, *International Symposium on Mathematical Theory of Networks and Systems*, St. Louis, 1996.
3. **Chairman**, *Third SIAM Conference on Linear Algebra in Signals, Systems and Control*, Seattle, 1993.
4. **Chairman**, *Second NIU Conference on Linear Algebra, Numerical Linear Algebra and Applications*, May 1991.
5. **Co-Chairman**, *Second SIAM Conference on Linear Algebra in Signals, Systems and Control*, San Francisco, 1990.
6. **Chairman**, *NIU Conference on Linear Algebra, Numerical Linear Algebra and Applications*, April 1989.
7. **Chairman**, *SIAM Conference on Linear Algebra in Signals, Systems and Control*, Boston, 1986.
8. **Chairman**, *American Mathematics Society (AMS) Summer Research Conference on Linear Algebra and its Role in Systems Theory*, Bowdoin College, Maine, 1984.
9. **Invited Member of International Board of Advisors**, *International Conference on Modeling, Simulation, and Applied Optimization*, 2008.

10. **Invited Member of the Program Committee**, *IEEE Conference on Control Applications*, Mexico City, 2001.
11. **Member of the International Steering Committee**, *Mathematical Theory of Networks and Systems*, 1996–.
12. **Invited Member** of the International Program Committee, *Mathematical Theory of Networks and Systems*, France, 2000.
13. **Invited member** of the Program Committee, *International Linear Algebra Society Conference on Fast Algorithms for Control, Systems, and Signal Processing*, Winnipeg, Manitoba, Canada, 1997.
14. **Invited Member** of the *Organizational Committee*, *SIAM Conference on Applied Linear Algebra*, 1997.
15. **Invited member** of the *Program Committee*, *International Linear Algebra Society Meeting* (in honor of Hans Schneider), 1998.
16. **Invited Member** of the Program Committee, *Mathematical Theory of Networks and Systems* (MTNS '98), 1998.
17. **Invited Member** of the Program Committee of the *International Linear Algebra Conference in honor of Professor Hans Schneider*, 1998.
18. **Invited Member** of the Program Committee, 1995 *International Linear Algebra Society Conference*, Atlanta.
19. **Invited Member** of the Program Committee, *Mathematical Theory of Networks and Systems*, 1987, 1989.
20. **Invited Member** of the Program Committee, *SIAM Conference on Control in the Nineties*, San Francisco, 1989.
21. **Invited Member** of the Scientific Committee and **U.S. Coordinator** of *International Conference on Linear Algebra and Applications*, Valencia, Spain, 1987.
22. **Invited Member** of the Program Committee, *IMACS International Symposium on Mathematical Modeling and Scientific Computing*, 1992.
23. Also, **organizer** and **chairman** of numerous invited special sessions, short courses, minisymposia, etc., for SIAM Conference, *IEEE Conference on Decision and Control*, *American Control Conference*, *symposia on Mathematical Theory of Networks and Systems*, etc.

DISSERTATION SUPERVISOR: *Doctoral Dissertations*

1. **Vadim Sokolov Inverse Eigenvalue Problems for Quadratic Matrix and Operator Pencils: Theory and Computations** (In Progress).
2. **Sanjoy Brahma, Numerically Robust Algorithms for Feedback Control in Matrix Second-Order Systems**, 2006.
3. **W. Peng Numerical Solutions of Large-Scale Matrix Equations Arising in Control** 2004.
4. **Joao Batista Carvalho, State Estimation and Finite Element Model Updating for Vibrating Systems**, July, 2002.
5. **Daniil Sarkissian, Theory and Computations of Partial Eigenvalue and Eigenstructure Assignment Problems in Matrix Second-Order and Distributed Parameter Systems**, June 2001 (now an **assistant professor** at Mississippi State University).

6. *Chandanie Hetti Arachige*, **On Numerical Solutions of the Sylvester-observer Equation, and the Multi-input Eigenvalue Assignment Problem**. Ph.D. dissertation, November 1, 1996 (Now an **industrial mathematician**).
7. *Samar Choudhary*, **Numerical Solutions of Large-Scale Linear Systems and Applications** Ph.D. dissertation, April, 1994, Northern Illinois University, (**now a computational scientist at IBM Research Corporation**).
8. *A. Purkayastha*, **Parallel Algorithms for Matrix Equations and Related Problems** Ph.D. dissertation, Northern Illinois University, July 1992, (now a **research scientist at University of Texas, Austin**).
9. *Mark Arnold*, **Algorithms and Conditioning for the Eigenvalue Assignment Problem** Ph.D. dissertation, Northern Illinois University, 1993, (now an **associate professor at University of Arkansas**).
10. *Fernando Rincón*, **Feedback Stabilization of Second-Order Models** Ph.D. dissertation, Northern Illinois University, July 1992, (now an **associate professor at University of Puerto Rico**).

Masters Theses

1. M. Lagadapati
Finite Element Model Updating in Structural Dynamics,
Northern Illinois University, 2005.
2. C. Moola
Finite Element Model Updating and Damage Detection,
Northern Illinois University, 2007.
3. Tatchi Ho
A study of computational methods for the continuous-time algebraic Riccati equation,
Northern Illinois University, 2000.
4. Dan Pierce
Computational Comparison of Four Methods for Finding the Inertia of a Matrix
M.S. thesis, Northern Illinois University, 1983, (now a **Senior Research Scientist and Manager at the Boeing Company**).
5. Rhoda Rice
Parallel Computations in Control Theory
M.S. thesis, Northern Illinois University, 1988.
6. Maria Estela
On the numerical solution of the Lyapunov and Stein's Equation
M.Sc. thesis, UNICAMP, Campinas, Brazil, 1980.
7. Sonia Regina Dal-Rei Murcia
A Study of Matrix Equations
M.S. thesis, UNICAMP, Campinas, Brazil, 1980.
8. Vera Laurenzi
Inertia-theory, Methods and Applications
M.Sc. thesis, UNICAMP, Campinas, Brazil, 1980.

9. Ana Maria Gomide Taube
A study of the relationships between various methods for solving the root-location problems
M.S. thesis, UNICAMP, Campinas, Brazil, 1979.
10. Olinda Tome Chama
M-Matrices and Their Applications
M.Sc. thesis, UNICAMP, Campinas, Brazil, 1979.
11. Heloisa Guedes de Alcantara
Symmetrizers and Their Applications to the Solution of the Problem for Computing Roots of a Polynomial
M.Sc. tThesis, UNICAMP, Campinas, Brazil, 1979 (co-supervisor José V. Zago).
12. Isabel Hamanaka
On the Numerical Solutions of $AX = XB$
Mathematics Systems Project, UNICAMP, 1979.
13. Hilda Batista Ramos
Numerical Comparison of Various Methods for Computing the Characteristic Polynomial of a Matrix
Mathematics Systems Project, Ramos, UNICAMP, 1979.
14. Elisa San Miguel
A Numerical Investigation of Two Algorithms for Computing the Characteristic Polynomial of a Matrix
Mathematics Systems Project, Ramos, UNICAMP, 1977.

COMMITTEE WORK

1. **Chairman of the Search Committee for Chair of Electrical Engineering Department**, Northern Illinois University, Fall 2002.
2. Member, **Personnel Committee**, Northern Illinois University, Department of Mathematical Sciences, 1982-83, 1983-84, 1984-85, 1986-87, 1988-89, 1989-90, 1990-91, 1992-93, 1995-1997, 2000, 2001, 2002.
3. Member, **Advisory Committee**, Northern Illinois University, Department of Mathematical Sciences, 1983-84, 1984-85, 1989-90, 1998, 2000.
4. Member, **Chair-Search Committee**, Department of Mathematical Sciences, Northern Illinois University, 1989.
5. Member, **Graduate Studies Committee**, Northern Illinois University, 1981, Fall 1992-Spring 1993, 1996-1997.
6. Member, **Faculty Appointment Committee on Applied and Computational Mathematics**, Northern Illinois University, Department of Mathematical Sciences, 1984-85, 1985-86, 1986-87, 1988-89.
7. Chairman of **Faculty Search Committee**, 1983-84, 1984-85, 1986-87, 1988-89, 1991-92.
8. Graduate students representative to the Department of Mathematics Council, University of Ottawa, Ontario, Canada, 1972.
9. Department representative to the graduate council, University of Ottawa, Ontario, Canada, 1972.
10. Joint secretary, Professor's Council, Chandernagore College, India, 1966-67.
11. Chairman, Control-System Group in "Autumn Course on System Analysis," Trieste, Italy, 1978.

Curriculum Development and Educational Committees

1. Developed the present curriculum in **Computational Mathematics** at Northern Illinois University, DeKalb, Illinois.
2. Member, **Undergraduate Studies Committee**, Northern Illinois University, Department of Mathematical Sciences, 1982-83.
3. **Coordinator** of “**Seminar on Numerical Analysis and Optimization**,” Northern Illinois University, several years since 1982.
4. **Coordinator** of the course MATH 240, Linear Algebra, Northern Illinois University, Fall 1982, Spring 1983, Fall 1983.
5. **Coordinator**, MATH 434, 435, Northern Illinois University, 1982-83, 1983-84, 1995-1996.
6. **Chairman of several textbook committees on undergraduate Linear Algebra**, Northern Illinois University.
7. Member of **post-graduate studies committee of Applied Mathematic Department**, Institute of Mathematics, Statistics and Computer Science, Universidade Estadual de Campinas, Campinas, Brazil, 1978-80.
8. **Coordinator of Departmental Seminars**, Department of Applied Mathematics, UNICAMP, Campinas, Brazil, 1978-80.

Fellowships

Ontario Graduate Fellowship, Province of Ontario, Government of Canada, 1970-71.

National Research Council of Canada Scholarship, 1971-72.

Director of Public Instruction, Government of West Bengal, India, 1958-60.

Biographical listing

Who's Who in Frontier of Science and Technology

Who's Who in WORLD

Personalities of America

Two Thousand Notable Americans

International Book of Honor

International Book of Distinguished Leaders

Men of Achievements

Member of the Research Board of Advisors of “The American Biographical Institute”, Inc.

TEACHING EXCELLENCE:

Selected by the Teaching Evaluation and Improvement Committee of the **Department of Computer Science of the University of Illinois at Urbana-Champaign**, as an **Excellent Instructor** for the year 1985.

References

Professor Michael Neumann
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(Past Editor IEEE Trans Automatic Control, Automatica, and a Fellow of IEEE Control Systems Society and American Society for Mechanical Engineers)