



Contents lists available at [SciVerse ScienceDirect](http://www.sciencedirect.com)

Linear Algebra and its Applications

journal homepage: www.elsevier.com/locate/laa



Moshe Goldberg



Moshe Goldberg

Moshe Goldberg was born in Tel Aviv in 1945. He earned his B.Sc. (1965), M.Sc. (1970), Ph.D. (1973), all in applied mathematics from Tel Aviv University. He was an Instructor in the Department of Mathematics of Tel Aviv University from 1972 to 1974, and then an Assistant Professor of Mathematics at the University of California, Los Angeles from 1974 to 1979. In 1979 he returned to Israel as a Senior Lecturer in the Department of Mathematics at the Technion. He progressed through the the professorial ranks and now holds The Ruth and Samuel Jaffe Chair in Mathematics at the Technion. Moshe was often travelling and had many long-term visits, in particular, California Institute of Technology (summers 1990 to 2008, and the University of California, Los Angeles (summers 1980 to 2011).

Moshe has served the international mathematics community and the Technion in many capacities. To name a few: organizing and scientific committees of many conferences and special invited sessions; Treasurer of the Israel Mathematics Union (1988–1990), President's Advisory Committee of the International Linear Algebra Society (2002–2005), the Technion Senate (1998 to present), and the Technion Committee for Honorary Degrees and Prizes (2006–2009, 2012–2013). Currently, at the Technion, he is on the Executive Committee of the Center for Mathematical Sciences and the Presidential Appointment Committee.

With his substantial and broad mathematical knowledge and expertise, Moshe has served or is serving on the editorial boards of a large number of journals. Thus he has served on the boards of *Linear Algebra Applies.* (20 years), *Lin. Multilin. Algebra* (6 years), *SIAM Journal on Matrix Analysis* (5 years), and *J. Inequalities in Pure and Applied Mathematics* (4 years). Presently he is on the editorial boards of eleven journals, including *The Elect. J. of Linear Algebra*, *Operators and Matrices*, *J. of Inequalities and Special Functions*, *J. of Adv. Res. in Diff. Equs.*, *Res. and Comms. in Math. and Math. Sciences*, and *Algebra*. Moshe is

a member of the Israel Mathematical Union, the American Mathematical Society, and the International Linear Algebra Society.

Moshe's Ph.D. thesis at Tel Aviv University was titled *Stable Approximations for Hyperbolic Systems with Moving Internal Boundary Conditions*, and he has maintained his interest and research on partial differential equations over the years. In addition, Moshe has published extensively on a variety of subjects including norms and subnorms, numerical range of matrices, mathematical inequalities, numerical methods for PDEs, functional equations, and power-associative algebras. His many collaborators include Richard Arens (12 papers), E.G. Straus (11 papers), W.A.J. Luxemburg (10 papers), and Eitan Tadmor (9 papers).

In addition to his love of mathematics, Moshe Goldberg has substantial interest and impressive knowledge in many other topics, including art, history, music, and wine. He is known and valued among his friends and colleagues for his broad perspective and well-informed opinions. Moshe is loyal and devoted to his family and friends, who have always reciprocated with respect, affection, and admiration.

Selected Publications (Moshe Goldberg)

1. S. Abarbanel and M. Goldberg, *Numerical solution of quasi-conservative hyperbolic systems—The cylindrical shock problem*, J. Computational Phys. **10** (1972), 1–21.
2. M. Goldberg, *A note on the stability of an iterative finite-difference method for hyperbolic systems*, Math. Comp. **27** (1973), 41–44.
3. M. Goldberg and G. Zwas, *On matrices having equal spectral radius and spectral norm*, Linear Algebra Appl. **8** (1974), 427–434.
4. M. Goldberg and S. Abarbanel, *Stable approximations for hyperbolic systems with moving internal boundary conditions*, Math. Comp. **28** (1974), 413–447.
5. M. Goldberg, E. Tadmor and G. Zwas, *The numerical radius and spectral matrices*, Linear and Multilinear Algebra **2** (1975), 317–326.
6. M. Goldberg, E. Tadmor and G. Zwas, *Numerical radius of positive matrices*, Linear Algebra Appl. **12** (1975), 209–214.
7. M. Goldberg and G. Zwas, *On inscribed circumscribed conics*, Elem. Math. **31** (1976), 36–38.
8. M. Goldberg and G. Zwas, *Inclusion relations between certain sets of matrices*, Linear and Multilinear Algebra **4** (1976), 55–60.
9. S. Abarbanel and M. Goldberg, *A test problem for numerical schemes for nonlinear hyperbolic equations*, Comput. Methods Appl. Mech. Engrg **8** (1976), 331–334.
10. M. Goldberg and E. G. Straus, *Inclusion relations involving k -numerical ranges*, Linear Algebra Appl. **15** (1976), 261–270.
11. M. Goldberg and E. G. Straus, *On characterizations and integrals of generalized numerical ranges*, Pacific J. Math. **69** (1977), 45–54.
12. M. Goldberg, *On a boundary extrapolation theorem by Kreiss*, Math. Comp. **31** (1977), 469–477.
13. M. Goldberg and E. G. Straus, *Elementary inclusion relations for generalized numerical ranges*, Linear Algebra Appl. **18** (1977), 1–24.
14. M. Goldberg and E. G. Straus, *On a theorem by Mirman*, Linear and Multilinear Algebra **5** (1977), 77–78.
15. M. Goldberg and E. Tadmor, *Scheme-independent stability criteria for difference approximations of hyperbolic initial-boundary value problems. I*, Math. Comp. **32** (1978), 1097–1107.
16. M. Goldberg and E. G. Straus, *Norm properties of C -numerical radii*, Linear Algebra Appl. **24** (1979), 113–131.
17. M. Goldberg, *On certain finite dimensional numerical ranges and numerical radii*, Linear and Multilinear Algebra **7** (1979), 329–342.
18. M. Goldberg and E. Tadmor, *Scheme-independent stability criteria for difference approximations of hyperbolic initial-boundary value problems. II*, Math. Comp. **36** (1981), 603–626.
19. M. Goldberg and E. Tadmor, *On the numerical radius and its applications*, Linear Algebra and Its Applications **42** (1982), 263–284.

20. M. Goldberg and E. G. Straus, *Operator norms, multiplicativity factors, and C-numerical radii*, Linear Algebra Appl. **43** (1982), 137–159.
21. M. Goldberg, *On the mapping $A \rightarrow A^+$* , Linear and Multilinear Algebra **12** (1983), 285–289.
22. M. Goldberg and E. G. Straus, *Multiplicativity of l_p norms for matrices*, Linear Algebra Appl. **52/53** (1983), 351–360.
23. M. Goldberg and E. G. Straus, *Multiplicativity factors for C-numerical radii*, Linear Algebra Appl. **54** (1983), 1–16.
24. M. Goldberg and E. G. Straus, *On generalizations of the Perron–Frobenius Theorem*, Linear and Multilinear Algebra **14** (1983), 143–156.
25. M. Goldberg, *In Memoriam Edwin F. Beckenbach*, in *General Inequalities 4* (W. Walter, Editor), Birkhäuser, Basel, 1984, pp. 3–11.
26. M. Goldberg, *Multiplicativity of l_p norms for matrices. II*, Linear Algebra Appl. **62** (1984), 1–10.
27. M. Goldberg, *Ernst G. Straus (1922–1983)*, Linear Algebra Appl. **64** (1985), 1–19.
28. M. Goldberg and E. Tadmor, *Convenient stability criteria for difference approximations of hyperbolic initial-boundary value problems*, Math. Comp **44** (1985), 361–377.
29. M. Goldberg, *Mixed multiplicativity and l_p norms for matrices*, Linear Algebra Appl. **73** (1986), 123–131.
30. M. Goldberg, *Equivalence constants for l_p norms of matrices*, Linear and Multilinear Algebra **21** (1987), 173–179.
31. M. Goldberg and E. Tadmor, *Convenient stability criteria for difference approximations of hyperbolic initial-boundary value problems. II*, Math. Comp. **48** (1987), 503–520.
32. M. Goldberg, *Multiplicativity factors and mixed multiplicativity*, Linear Algebra Appl. **97** (1987), 45–56.
33. M. Goldberg, *A note on monotonic and semi-monotonic matrix functions*, Linear and Multilinear Algebra **24** (1989), 223–226.
34. R. Arens and M. Goldberg, *Multiplicativity factors for seminorms*, J. Math. Anal. Appl. **146** (1990), 469–481.
35. M. Goldberg, *Quasimonotonic functions on \mathbf{C}^n and the mapping $f \rightarrow f^+$* , Linear and Multilinear Algebra **27** (1990), 63–71.
36. R. Arens and M. Goldberg, *A class of seminorms on function algebras*, J. Math. Anal. Appl. **162** (1991), 592–609.
37. R. Arens, M. Goldberg and W. A. J. Luxemburg, *Multiplicativity factors for seminorms. II*, J. Math. Anal. Appl. **170** (1992), 401–413.
38. R. Arens and M. Goldberg, *Quadratic seminorms and Jordan structures on Algebras*, Linear Algebra Appl. **181** (1993), 269–278.
39. R. Arens, M. Goldberg and W. A. J. Luxemburg, *Multiplicativity factors for function norms*, J. Math. Anal. Appl. **177** (1993), 368–385.
40. R. Arens, M. Goldberg and W. A. J. Luxemburg, *Multiplicativity factors for Orlicz space function norms*, J. Math. Anal. Appl. **177** (1993), 386–411.
41. R. Arens and M. Goldberg, *Weighted l_∞ norms for matrices*, Linear Algebra Appl. **201** (1994), 155–163.
42. M. Goldberg, *Simple stability criteria for difference approximations of hyperbolic initial-boundary value problems. III*, Math. Comput. Modelling **20** (1994), 49–54.
43. R. Arens and M. Goldberg, *Homotonic mappings*, J. Math. Anal. Appl. **194** (1995), 414–427.
44. R. Arens and M. Goldberg, *Weighted l_1 norms for matrices*, Linear and Multilinear Algebra **40** (1996), 229–234.
45. R. Arens and M. Goldberg, *Jordan-multiplicative norms*, Linear and Multilinear Algebra **41** (1996), 9–18.
46. M. Goldberg, *Morris Newman—a discrete mathematician for all seasons*, Linear Algebra Appl. **254** (1997), 7–18.
47. R. Arens and M. Goldberg, *Multilinear operators and weighted l_1 norms*, Linear Algebra Appl. **267** (1997), 1–10.

48. M. Goldberg, *Stable difference schemes for parabolic systems—a numerical radius approach*, SIAM J. Numer. Anal. **35** (1998), 478–493.
49. R. Arens, M. Goldberg and W. A. J. Luxemburg, *Stable Seminorms Revisited*, Math. Inequal. Appl. **1** (1998), 31–40.
50. M. Goldberg, *Stable difference schemes for parabolic systems—a numerical radius approach II*, SIAM J. Numer. Anal. **35** (1998), 1995–2003.
51. R. Arens, M. Goldberg and W. A. J. Luxemburg, *Stable norms on complex numbers and quaternions*, J. Algebra **219** (1999), 1–15.
52. M. Goldberg and W. A. J. Luxemburg, *Stable Subnorms*, Linear Algebra Appl. **307** (2000), 89–101.
53. M. Goldberg, *Stability criteria for finite difference approximations to parabolic systems*, Appl. Numer. Math. **33** (2000), 509–515.
54. M. Goldberg and W. A. J. Luxemburg, *Discontinuous subnorms*, Linear and Multilinear Algebra **49** (2001), 1–24.
55. M. Goldberg, R. Guralnick and W. A. J. Luxemburg, *Not all quadrature norms are strongly stable*, Indag. Math. (N.S.) **12** (2001), 469–476.
56. M. Goldberg and A. Pidgirnyak, *Stability criteria for finite difference approximations to parabolic systems—an update*, J. Sci. Comput. **17** (2002), 423–435.
57. M. Goldberg, R. Guralnick and W. A. J. Luxemburg, *Stable subnorms II*, Linear and Multilinear Algebra **51** (2003), 209–219.
58. M. Goldberg and W. A. J. Luxemburg, *Stable subnorms revisited*, Pacific J. Math. **215** (2004), 15–27.
59. M. Goldberg, *Stable norms—from theory to applications and back*, Linear Algebra Appl. **404** (2005), 223–250.
60. M. Goldberg, *Minimal polynomials and radii of elements in finite-dimensional power-associative algebras*, Trans. Amer. Math. Soc. **359** (2007), 4055–4072.
61. M. Goldberg, *Radii and subnorms on finite-dimensional power-associative algebras*, Linear and Multilinear Algebra **55** (2007), 405–415.
62. M. Goldberg, *Stable subnorms on finite-dimensional power-associative algebras*, Electron. J. Linear Algebra **17** (2008), 359–275.
63. M. Cwikel and M. Goldberg, *Homotonic algebras*, Studia Math. **195** (2009), 287–295.
64. M. Goldberg and E. Levy, *The power equation*, Electron. J. Linear Algebra **22** (2011), 810–821.
65. M. Goldberg and T. J. Laffey, *Radii of elements in Cayley–Dickson algebras*, to appear.