

CURRICULUM VITAE

JOSEPH A. BALL

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EDUCATION

- B.Sci. (Mathematics), 1969, Georgetown Univ., Washington, D.C.
- M.Sci. (Mathematics), 1970, Univ. of Virginia, Charlottesville
- Ph.D. (Mathematics), 1973, Univ. of Virginia, Charlottesville; Dissertation: "Unitary Perturbations of Contraction Operators"

EMPLOYMENT:

- Assistant Professor, Department of Mathematics, Virginia Tech, Blacksburg, Virginia (September 1973 to December 1978)
- Mathematician, Dahlgren U.S. Navy Weapons Research Lab, Summer 1975
- Visiting Assistant Professor, Department of Mathematics, University of California at San Diego, La Jolla, California (January-June 1978; September 1979-June 1980)
- Associate Professor, Department of Mathematics, Virginia Tech, Blacksburg, Virginia (September 1978-August 1982)
- Professor, Department of Mathematics, Virginia Tech (September 1982-June 2016)
- Visiting Professor, Weizmann Institute of Science, Rehovot, Israel (January-June 1983)
- Visiting Professor, University of California at San Diego, La Jolla, California (March-June 1987 and 1991)
- Full Member, Mathematical Sciences Research Institute "Holomorphic Spaces" program, Berkeley, California (September-December, 1995)
- Professor Emeritus, Department of Mathematics, Virginia Tech, Blacksburg, Virginia (June 2016-present)

HONORS:

- Alumni Award for Research Excellence, Virginia Tech, 1997
- Fellow of the American Mathematical Society, class of 2019

GRANTS:

- Co-principal investigator (with D. Kaliuzhnyi-Verbovetskyi and V. Vinnikov) for Israel-USA Binational Science Foundation Grant #2010432 "Non-commutative Function Theory and Its Applications", award dates 10/2011-09/2016, \$154,675

- Co-principal investigator with M. Klaus, L. Rodman and J.W. Helton) for NSF Grant #DMS-0126746 “Thirteenth International Workshop on Operator Theory and Applications”, award dates 01 May 2002–30 April 2003, \$15,000.
- Principal investigator for NSF Grant #DMS-9987636 “Problems in Multidimensional and Nonlinear System Theory”, award dates 08/15/00 to 07/31/03, \$81,098.00.
- Co-principal investigator (with D. Alpay, C. Sadosky and V. Vinnikov) for Israel-USA Binational Science Foundation Grant #1999252 “Multidimensional Systems, Multivariable Operator Model Theory, Scattering and Function Theory”, award dates 9/01/00-8/31/03; renewed for 11/01/03-10/31/07. budget: \$20,000 per year; this grant resulted in joint publications with Israeli colleagues.
- Co-principal investigator (with P. Kachroo of Center for Transportation Research, Virginia Tech) for Federal Highway Administration Grant DTFG61-93-X-00017-002 “On-line Traffic Signal Timing Using Feedback Control”, award dates 10/01/96-09/30/97, \$6,446.00
- Principal investigator for NSF Grant DMS-9500912, “Topics in Interpolation and System Theory”, award dates 06/01/95-05/31/98, \$47,490.00
- Principal investigator for NSF Grant DMS-9101400, “Operator and System Theory” award dates 08/15/91-01/31/94, \$50,564.00
- Principal investigator for NSF Grant DMS-8701615, award dates 06/01/87-11/30/90, \$82,460.00
- Co-principal investigator (with R.F. Olin and J.E. Thomson) for NSF Grant DMS-8401704, award dates 06/01/84-11/30/87, \$185,850.00
- Co-principal investigator (with R.F. Olin and J.E. Thomson) for NSF Grant MCS-8101678 , award dates 06/01/81-11/30/83, \$100,750.00
- Co-principal investigator (with R.F. Olin and J.E. Thomson) for NSF Grant MCS-7700966 , award dates 06/01/77-11/30/80, \$84,951.00

Ph.D. DISSERTATIONS DIRECTED:

- Thomas R. Faney, *Closability of Differential Operators and Subjordan Operators*, May, 1989.
- Marek Rakowski, *Zero-pole Interpolation of Nonregular Rational Matrix Functions*, December, 1989.
- Jeongook Kang [Kim], *Interpolation by Rational Matrix Functions with Minimal McMillan Degree*, December, 1990
- Lonnie Carpenter, *Cascade Analysis and Synthesis of Transfer Functions of Infinite Dimensional Linear Systems*, May, 1992.
- Tusheng Yu, *On-line Traffic Signalization using Robust Feedback Control*, January, 1998.
- Jerawan Chudoung, *Robust Control for Hybrid Systems with Applications to Network Traffic Problems*, May, 2000.
- Tanit Malakorn, *Multidimensional Linear Systems and Robust Control*, May, 2003.
- Pushkin Kachroo, *Optimal and Feedback Control for Hyperbolic Conservation Laws*, June, 2007.
- Quanlei Fang, *Multivariable Interpolation Problems*, July, 2008.

- Grant M. Boquet, *Geometric Properties of Over-Determined Systems of Linear Partial Difference Equations*, February, 2010.
- Daniel Sutton, *Structure of Invariant Subspaces for Left Invertible Operators on Hilbert Space*. July, 2010.
- Moisés D. Guerra-Huamán, *Schur Class of Finitely Connected Planar Domains: The Test Function Approach*, April 2011.
- Austin J. Amaya, *Beurling-Lax Representations of Shift-Invariant Spaces, Zero-Pole Data Interpolation and Dichotomous Transfer-Function Realizations: Half-Plane/Continuous-Time Versions*, April 2012
- Gregory Marx, *Noncommutative Kernels*, May 2017.

MEMEBER OF EDITORIAL BOARD OF:

- *Integral Equations and Operator Theory*, 1984-;
- *Systems & Control Letters*, 1987-1992;
- *Journal of the Mathematics of Systems, Estimation, and Control*, 1990-1996;
- *Journal of Mathematical Analysis and Applications*, 1994-.
- *Proceedings of the American Mathematical Society*, 1999-2007;
- *Complex Analysis and Operator Theory*, 2006-;
- *Banach Journal of Mathematical Analysis*, 2010-.

OTHER PROFESSIONAL SERVICE:

- Member of local organizing committee for IWOTA 2002 (International Workshop on Operator Theory and Applications), Virginia Tech, August 6-9, 2002.
- Member of scientific committee for IWOTA2003, Cagliari, Sardinia (Italy), June 24-27, 2003.
- Member of Steering Committee for biannual MTNS (Mathematical Theory of Networks and Systems) International Symposium (2002-)
- Member of Steering Committee for biannual IWOTA (International Workshop on Operator Theory and Applications) meeting (2002-)
- Member of local organizing committee for IWOTA 2008 (International Workshop on Operator Theory and Applications), College of William & Mary, July 22-26, 2008.
- Member and Chair of local organizing committee for MTNS 2008 (Mathematical Theory of Networks and Systems), Virginia Tech, July 28-August 1, 2008; President of MTNS: 2008-2010.
- Member of IWOTA Presidium, 2009-.

PUBLICATIONS SINCE THE YEAR 2000:

- (1) **J.A. Ball** and V. Bolotnikov, *The rational interpolation problem: Grassmannian and Loewner-matrix approaches*, Realization and Model Reduction of Dynamical Systems - a Festschrift in honor of the 70th birthday of Thanos Antoulas, 3 - 21, Springer, Cham (2022).
- (2) **J.A. Ball**, S. ter Horst, and M. Kurula, *The infinite-dimensional standard and strict bounded real lemmas in continuous time: the storage function approach*, Complex Anal. Oper. Theory 16 (2022), no. 6, Paper No. 84, 77 pp.

- (3) **J.A. Ball** and V. Bolotnikov, *Noncommutative Function-Theoretic Operator Theory and Applications*, Cambridge Tracts in Mathematics, 225. Cambridge University Press, Cambridge, 2022.
- (4) **J.A. Ball** and H. Sau, *Functional models for commuting Hilbert-space contractions*, Operator Theory, Operator Algebras and Their Interactions with Geometry and Topology: Ronald G. Douglas Memorial Volume, 11 - 54, Oper. Theory Adv. Appl., 278, Birkhäuser/Springer, Cham, 2020.
- (5) **J.A. Ball** and V. Bolotnikov, *Interpolation by contractive multipliers between Fock spaces*, Complex Function Theory, Operator Theory, Schur Analysis and Systems Theory - a volume in honor of V. E. Katsnelson, 79 - 138, Oper. Theory Adv. Appl. 280, Birkhäuser/Springer, Cham, 2020.
- (6) **J.A. Ball** Ball, and H. Sau, *Rational dilation of tetrablock contractions revisited*, J. Funct. Anal. 278 (2020), no. 1, 108275, 14 pp.
- (7) **J.A. Ball** and V. Bolotnikov, *Stieltjes functions and associated pairs of reproducing kernel Hilbert spaces*, Linear Systems, Signal Processing and Hypercomplex Analysis, 1 - 47, Oper. Theory Adv. Appl. 275, Linear Oper Linear Syst., Birkhäuser/Springer, Cham, 2019.
- (8) **J.A. Ball**, G.J. Groenewald, and S. ter Horst, *Standard versus strict bounded real lemma with infinite-dimensional state space III: the dichotomous and bicausal cases*, Operator Theory, Analysis and the State Space Approach, 23 - 73, Oper. Theory Adv. Appl. 271, Birkhäuser/Springer, Cham, 2018.
- (9) **J.A. Ball**, G.J. Groenewald, S. ter Horst, *Standard versus strict bounded real lemma with infinite-dimensional state space. I. The state-space-similarity approach*, J. Operator Theory 80 (2018), no. 1, 225 - 253.
- (10) **J.A. Ball**, G.J. Groenewald, and S. ter Horst, *Standard versus strict bounded real lemma with infinite-dimensional state space II: The storage function approach*, The Diversity and Beauty of Applied Operator Theory, 1 - 50, Oper. Theory Adv Appl. 268, Birkhäuser/Springer, Cham, 2018.
- (11) **J.A. Ball**, G. Marx, and V. Vinnikov, *Interpolation and transfer-function realization for the noncommutative Schur-Agler class*, Operator Theory in Different Settings and Related Applications 23 - 116, Oper. Theory Adv. Appl. 262, Birkhäuser/Springer, Cham, 2018.
- (12) **J.A. Ball** M. Kurula, and O.J. Staffans, *A conservative de Branges - Rovnyak functional model for operator Schur functions on \mathbb{C}_+* , Complex Anal. Oper. Theory 12 (2018), no. 4, 877 - 915.
- (13) **J.A. Ball** and V. Bolotnikov, *The bitangential matrix Nevanlinna-Pick interpolation problem revisited*, Indefinite Inner Product Spaces, Schur Analysis, and Differential Equations, 107 - 161, Oper. Theory Adv. Appl. 263, Birkhäuser/Springer, Cham, 2018.
- (14) **J.A. Ball** and V. Bolotnikov, *Contractive multipliers from Hardy space to weighted Hardy space*, Proc. Amer. Math. Soc. 145 (2017), no. 6, 2411 - 2425.
- (15) **J.A. Ball**, K.F. Clancey, and V. Vinnikov, *Meromorphic matrix trivializations of factors of automorphy over a Riemann surface*, Oper. Matrices 10 (2016), no. 4, 785 - 828.
- (16) **J.A. Ball**, G. Marx, and V. Vinnikov, *Noncommutative reproducing kernel Hilbert spaces*, J. Funct. Anal. 271 (2016), no. 7, 1844 - 1920.

- (17) **J.A. Ball** and V. Bolotnikov, *On the expansive property of inner functions in weighted Hardy spaces*, Complex Analysis and Dynamical Systems VI. Part 2, 47 - 61, Contemp. Math., 667, Israel Math. Conf. Proc., Amer. Math. Soc., Providence, RI, 2016.
- (18) **J.A. Ball**, G.J. Groenewald, and S. ter Horst, *Bounded real lemma and structured singular value versus diagonal scaling: the free noncommutative setting*, Multidimens. Syst. Signal Process. 27 (2016), no. 1, 217 - 254.
- (19) **J.A. Ball** and D.S. Kaliuzhnyi-Verbovetskyi, *Schur-Agler and Herglotz-Agler classes of functions: positive-kernel decompositions and transfer-function realizations*, Adv. Math. 280 (2015), 121 - 187.
- (20) **J.A. Ball**, D.S. Kaliuzhnyi-Verbovetskyi, C. Sadosky and V. Vinnikov, *Scattering systems with several evolutions and formal reproducing kernel Hilbert spaces*, Complex Anal. Oper. Theory 9 (2015), no 4, 827 - 931.
- (21) **J.A. Ball**, M. Kurula, O.J. Staffans, and H. Zwart, *De Branges-Rovnyak realizations of operator-valued Schur functions on the complex right half-plane*, Complex Anal. Oper. Theory 9 (2015), no. 4, 723 - 792.
- (22) **J.A. Ball** and D.S. Kaliuzhnyi-Verbovetskyi, *Rational Cayley inner Herglotz-Agler functions: positive-kernel decompositions and transfer-function realizations*, Linear Algebra Appl. 456 (2014), 138 - 156.
- (23) **J.A. Ball** and V. Bolotnikov, *Interpolation in sub-Bergman spaces*, Advances in Structured Operator Theory and Related Areas, 17 - 39, Oper. Theory Adv. Appl., 237, Birkhäuser/Springer, Basel, 2013.
- (24) **J.A. Ball** and M.D. Guerra-Huamán, *Convexity analysis and the matrix-valued Schur class over finitely connected planar domains*, J. Operator Theory 70 (2013), no. 2, 531 - 571.
- (25) **J.A. Ball** and V. Bolotnikov, *Weighted Hardy spaces: shift invariant and coinvariant subspaces, linear systems and operator model theory*, Acta Sci. Math. (Szeged) 79 (2013), no. 3-4, 623 - 686.
- (26) J. Agler, **J.A. Ball**, and J.E. McCarthy, *The Takagi problem on the disk and bidisk*, Acta Sci. Math. (Szeged) 79 (2013), no. 1 - 2, 63 - 78.
- (27) **J.A. Ball** and V. Bolotnikov, *A Beurling type theorem in weighted Bergman spaces*, C.R. Math. Acad. Sci. Paris 351 (2013), no. 1-12, 433 - 436.
- (28) **J.A. Ball** and A. Kheifets, *The inverse commutant lifting problem II: Hellinger functional-model spaces*, Complex Anal. Oper. Theory 7 (2013), no. 4, 873 - 907.
- (29) **J.A. Ball** and V. Bolotnikov, *Weighted Bergman spaces: shift-invariant subspaces and input/state/output linear systems*, Integral Equations Operator Theory 76 (2013), no. 3, 301 - 356.
- (30) **J.A. Ball** and M.D. Guerra-Huamán, —em Test functions, Schur-Agler classes and transfer-function realizations: the matrix-valued setting, Complex Anal. Oper. Theory 7 (2013), no. 3, 529 - 575.
- (31) **J.A. Ball** and V. Bolotnikov, *Canonical transfer-function realization for Schur multipliers on the Drury-Arveson space and models for commuting row contractions*, Indiana Univ. Math. J. 61 (2012), no. 2, 665 - 716.
- (32) **J.A. Ball** and Q. Fang, *Nevanlinna-Pick interpolation via graph spaces and Kreĭn-space geometry: a survey*. Mathematical Methods in Systems, Optimization, and Control 43 - 71, Oper. Theory Adv Appl. 222, Birkhäuser/Springer Basel AG, Basel, 2012.

- (33) **J.A. Ball** and A.J. Sasane, *Extension of the ν -metric: the H^∞ case*, Spectral Theory, Mathematical System Theory, Evolution Equations, Differential and Difference Equations, 121 - 130, Oper. Theory Adv. Appl. 221, Birkhäuser/Springer Basel AG, Basel, 2012.
- (34) **J.A. Ball** and V. Bolotnikov, *Canonical transfer-function realization for Schur-Agler-class functions on domains with matrix polynomial defining function in \mathbb{C}^n* , Recent Progress in Operator Theory and its Applications 23 - 55, Oper. Theory Adv. Appl. 220, Birkhäuser/Springer Basel AG, Basel, 2012.
- (35) **J.A. Ball** and V. Bolotnikov, *Canonical transfer-function realization for Schur-Agler-class functions of the polydisk*, A Panorama of Modern Operator Theory and Related Topics 75 - 122, Oper. Theory Adv. Appl. 218, Birkhäuser/Springer Basel AG, Basel, 2012.
- (36) **J.A. Ball** and A.J. Sasane, *Extension of the ν - metric*, Complex Anal. Oper. Theory 6 (2012), no. 1, 65 - 89.
- (37) **J.A. Ball**, G.M. Boquet, and V. Vinnikov, *A behavioral interpretation of Livšic systems*, Multidimens. Syst. Signal Process. 23 (2012), no. 1 - 2, 17 - 48.
- (38) **J.A. Ball**, V. Bolotnikov, and S. ter Horst, *Abstract interpolation in vector-valued de Branges-Rovnyak spaces*, Integral Equations Operator Theory 70 (2011), no. 2, 227 - 263.
- (39) **J.A. Ball** and A. Kheifets, *The inverse commutant lifting problem, I: Coordinate-free formalism*, Integral Equations Operator Theory 70 (2011), no. 1, 17 - 62.
- (40) **J.A. Ball**, *Multidimensional circuit synthesis and multivariable dilation theory*. Multidimens. Syst. Signal Process. 22 (2011), no. 1 - 3, 27 - 44.
- (41) **J.A. Ball**, V. Bolotnikov, and S. ter Horst, *Interpolation in de Branges - Rovnyak spaces*, Proc. Amer. Math. Soc. 139 (2011), no. 2, 609 - 618.
- (42) **J.A. Ball** and S. ter Horst, *Robust control, multidimensional systems and multivariable Nevanlinna-Pick interpolation*, Topics in Operator Theory Volume 2: Systems and Mathematical Physics, 13 - 88, Oper. Theory Adv. Appl. 203, Birkhäuser Verlag, Basel, 2010.
- (43) **J.A. Ball** and S. ter Horst, *Multivariable operator-valued Nevanlinna-Pick interpolation: a survey*. Operator Algebras, Operator Theory and Applications 1 - 72, Oper. Theory Adv. Appl. 195, Birkhäuser Verlag, Basel, 2010.
- (44) **J.A. Ball**, V. Bolotnikov, and S. ter Horst, *A constrained Nevanlinna-Pick interpolation problem for matrix-valued functions*, Indiana Univ. Math. J. 59 (2010), no. 1, 15 - 51.
- (45) **J.A. Ball** and V. Bolotnikov, *Canonical de Branges-Rovnyak model transfer-function realization for multivariable Schur-class functions*, Hilbert Spaces of Analytic Functions 1 - 39, CRM Proceedings and Lecture Notes 51, American Math. Soc. (Providence), 2010.
- (46) **J.A. Ball**, A. Biswas, Q. Fang, and S. ter Horst, *Multivariable generalizations of the Schur class: positive kernel characterization and transfer function realization*, Recent Advances in Operator Theory and Applications 17 - 79, Oper. Theory Adv. Appl. 187, Birkhäuser, Basel, 2009.

- (47) **J.A. Ball** Q. Fang, G.J. Groenewald, and S. ter Horst, *Equivalence of robust stabilization and robust performance via feedback*, Math. Control Signals Systems 21 (2009), no. 1, 51 - 68.
- (48) **J.A. Ball** and V. Bolotnikov, *Interpolation problems for Schur multipliers on the Drury-Arveson space: from Nevanlinna-Pick to abstract interpolation problem*, Integral Equations Operator Theory 62 (2008), no. 3, 301 - 349.
- (49) **J.A. Ball** and D.S. Kaliuzhnyi-Verbovetskyi, *Conservative dilations of dissipative multidimensional systems: the commutative and non-commutative settings*, Multidimens. Syst. Signal Process. 19 (2008), no. 1, 79 - 122.
- (50) **J.A. Ball**, V. Bolotnikov, and Q. Fang, *Schur-class multipliers on the Arveson space: de Branges-Rovnyak reproducing kernel spaces and commutative transfer-function realizations*, J. Math. Anal. Appl. 341 (2008), no. 1, 519 - 539.
- (51) **J.A. Ball**, P.T. Carroll, and Y. Uetake, *Lax-Phillips scattering theory and well-posed linear systems: a coordinate-free approach*, Math. Control Signals Systems 20 (2008), no. 1, 37 - 79.
- (52) **J.A. Ball**, V. Bolotnikov, and Q. Fang, *Multivariable backward-shift-invariant subspaces and observability operators*, Multidimens. Syst. Signal Process. 18 (2007), no. 4, 191 - 248.
- (53) **J.A. Ball**, V. Bolotnikov, Q. Fang, *Schur-class multipliers on the Fock space: de Branges-Rovnyak reproducing kernel spaces and transfer-function realizations*, Operator Theory, Structured Matrices, and Dilations 85 - 114, Theta Ser. Adv. Math. 7, Theta, Bucharest, 2007.
- (54) **J.A. Ball** and V. Bolotnikov, *Interpolation in the noncommutative Schur-Agler class*, J. Operator Theory 58 (2007), no. 1, 83 - 126.
- (55) **J.A. Ball**, V. Bolotnikov, and Q. Fang, *Transfer-function realization for multipliers of the Arveson space*, J. Math. Anal. Appl. 333 (2007), no. 1, 68 - 92.
- (56) J.A. Ball, and M.W. Raney, *Discrete-time dichotomous well-posed linear systems and generalized Schur-Nevanlinna-Pick interpolation*, Complex Anal. Oper. Theory 1 (2007), no. 1, 1 - 54.
- (57) J.A. Ball, G.J. Groenewald, and T. Malakorn, *Bounded real lemma for structured noncommutative multidimensional linear systems and robust control*, Multidimens. Syst. Signal Process. 17 (2006), no. 2 - 3, 119 - 150.
- (58) J.A. Ball and O.J. Staffans, *Conservative state-space realizations of dissipative system behaviors*, Integral Equations Operator Theory 54 (2006), no. 2, 151 - 213.
- (59) **J.A. Ball** and A.J. Sasane, *Equivalence of a behavioral distance and the gap metric*, Systems Control Lett. 55 (2006), no. 3, 214 - 222.
- (60) **J.A. Ball**, C. Sadosky, and V. Vinnikov, *Scattering systems with several evolutions and multidimensional input/state/output systems*, Integral Equations Operator Theory 52 (2005), no. 3, 323 - 393.
- (61) **J.A. Ball**, G.J. Groenewald, and T. Malakorn, *Structured noncommutative multidimensional linear systems*, SIAM J. Control Optim. 44 (2005), no. 4, 1474 - 1528.

- (62) **J.A. Ball**, K.M. Mikkola, and A.J Sasane, *State-space formulas for the Nehari-Takagi problem for nonexponentially stable infinite-dimensional systems*, SIAM J. Control Optim. 44 (2005), no. 2, 531 - 563.
- (63) **J.A. Ball** and V. Vinnikov, *Lax-Phillips scattering and conservative linear systems: a Cuntz-algebra multidimensional setting*, Mem. Amer. Math. Soc. 178 (2005) no. 837, iv+101 pp.
- (64) **J.A. Ball** and V. Bolotnikov, *Nevanlinna-Pick interpolation for Schur-Agler class functions on domains with matrix polynomial defining function in \mathbb{C}^n* , New York J. Math. 11 (2005), 247 - 290.
- (65) **J.A. Ball**, C. Sadosky, and V. Vinnikov, *Conservative input-state-output systems with evolution on a multidimensional integer lattice*, Multidimens. Syst. Signal Process. 16 (2005), no. 2, 133 - 198.
- (66) **J.A. Ball** and V. Vinnikov, *Functional models for representations of the Cuntz algebra*, Operator Theory, Systems Theory and Scattering Theory: Multidimensional Generalizations 1 - 60, Oper. Theory Adv. Appl., 157, Birkhäuser, Basel, 2005.
- (67) **J.A. Ball**, C. Sadosky, and V. Vinnikov, *Conservative linear systems, unitary colligations and Lax-Phillips scattering: multidimensional generalizations*, Internat. J. Control 77 (2004), no. 9, 802 - 811.
- (68) **J.A. Ball** and V. Bolotnikov, *Realization and interpolation for Schur-Agler-class functions on domains with matrix polynomial defining function in \mathbb{C}^n* , J. Funct. Anal. 213 (2004), no. 1, 45 - 87.
- (69) **J.A. Ball** and V. Bolotnikov, *Boundary interpolation for contractive-valued functions on circular domains in \mathbb{C}^n* , Current Trends in Operator Theory and its Applications 107 - 132, Oper. Theory Adv. Appl. 149, Birkhäuser, Basel, 2004.
- (70) **J.A. Ball**, M.A. Petersen, and A. van der Schaft, *Inner-outer factorization for nonlinear noninvertible systems*, IEEE Trans. Automat. Control 49 (2004), no. 4, 483 - 492.
- (71) **J.A. Ball** and T. Malakorn, *Multidimensional linear feedback control systems and interpolation problems for multivariable holomorphic functions*, Multidimens. Systems Signal Process. 15 (2004), no. 1, 7 - 36.
- (72) **J.A. Ball** and V. Vinnikov, *Overdetermined multidimensional systems: state space and frequency domain methods*, Mathematical Systems Theory in Biology, Communications, Computation, and Finance (Notre Dame, IN, 2002), 63 - 119, IMA Vol. Math. Appl. 134, Springer, New York, 2003.
- (73) **J.A. Ball** and V. Vinnikov, *Formal reproducing kernel Hilbert spaces: the commutative and noncommutative settings*, Reproducing Kernel Spaces and Applications 77 - 134, Oper. Theory Adv. Appl. 143, Birkhäuser, Basel, 2003.
- (74) **J.A. Ball** and M.A. Petersen, *Non-linear minimal square spectral factorization*, Internat. J. Control 76 (2003), no. 12, 1233 - 1247.
- (75) **J.A. Ball** and V. Bolotnikov, *A bitangential interpolation problem on the closed unit ball for multipliers of the Arveson space*, Integral Equations Operator Theory 46 (2003), no. 2, 125 - 164.

- (76) **J.A. Ball**, K.F. Clancey, and V. Vinnikov, *Concrete interpolation of meromorphic matrix functions on Riemann surfaces*, Interpolation Theory, Systems Theory and Related Topics (Tel Aviv/Rehovot, 1999) 137 - 156, Oper. Theory Adv. Appl., 134, Birkhäuser, Basel, 2002.
- (77) **J.A. Ball**, J. Chudoung, and M.V. Day, *Robust optimal switching control for nonlinear systems*, SIAM J. Control Optim. 41 (2002), no. 3, 900 - 931
- (78) **J.A. Ball**, L.Rodman, and I.M. Spitkovsky, *Toeplitz corona problem for algebras of almost periodic functions*, Toeplitz Matrices and Singular Integral Equations (Pobershau, 2001), 25 - 37, Oper. Theory Adv. Appl. 135, Birkhäuser, Basel, 2002.
- (79) **J.A. Ball** and V. Bolotnikov, *A tangential interpolation problem on the distinguished boundary of the polydisk for the Schur-Agler class*, J. Math. Anal. Appl 273 (2002), no. 2, 328 - 348.
- (80) **J.A. Ball**, J. Chudoung, and M.V. Day, *Robust optimal stopping-time control for nonlinear systems*, Appl. Math. Optim. 46 (2002), no. 1, 1 - 29.
- (81) **J.A. Ball** and V. Bolotnikov, *On a bitangential interpolation problem for contractive-valued functions on the unit ball*, Linear Algebra Appl. 353 (2002), 107 - 147.
- (82) D. Alpay, **J.A. Ball**, and Y. Peretz, *System theory, operator models and scattering: the time-varying case*, J. Operator Theory 47 (2002), no. 2, 245 - 286.
- (83) **J.A. Ball** and V. Vinnikov, *Hardy spaces on a finite bordered Riemann surface, multivariable operator model theory and Fourier analysis along a unimodular curve*, Systems, Approximation, Singular Integral Operators, and Related Topics (Bordeaux, 2000) 37 - 56, Oper. Theory Adv. Appl., 129, Birkhäuser, Basel, 2001.
- (84) **J.A. Ball**, T.T. Trent, and V. Vinnikov, *Interpolation and commutant lifting for multipliers on reproducing kernel Hilbert spaces*, Operator Theory and Analysis (Amsterdam, 1997), 89 - 138, Oper. Theory Adv. Appl. 122, Birkhäuser, Basel, 2001.
- (85) D. Alpay, **J.A. Ball**, and V. Bolotnikov, *On the bitangential interpolation problem for contractive valued functions in the polydisk*, J. Operator Theory 44 (2000), no. 2, 277 - 301.
- (86) **J.A. Ball**, and J. Chudoung, *Comparison theorems for viscosity solutions of a system of quasivariational inequalities with application to optimal control with switching costs*, J. Math. Anal. Appl. 251 (2000), no. 1, 40 - 64.
- (87) **J.A. Ball** and T.T. Trent, *The abstract interpolation problem and commutant lifting: a coordinate-free approach*, Operator Theory and Interpolation (Bloomington, IN, 1996) 51 - 83, Oper. Theory Adv. Appl. 115, Birkhäuser, Basel, 2000.
- (88) **J.A. Ball** and N.J. Young, *Problems on the realization of functions*, Operator Theory and its Applications (Winnipeg, MB, 1998), 179185, Fields Inst. Commun., 25, Amer. Math. Soc., Providence, RI, 2000.
- (89) **J.A. Ball**, *Linear systems, operator model theory and scattering: multivariable generalizations*, Operator Theory and its Applications (Winnipeg, MB, 1998), 151 - 178, Fields Inst. Commun. 25, Amer. Math. Soc., Providence, RI, 2000.