

Bibliography

- [1] Anderson, B.D.O., & J.B. Moore, 1979: *Optimal Filtering*. Prentice–Hall, 357 pp.
- [2] Andersson, E., J. Pailleux, J.–N. Thépaut, J.R. Eyre, A.P. McNally, G.A. Kelly, & P. Courtier, 1993: Use of radiances in 3D/4D variational data assimilation. *Proc. ECMWF Workshop on Variational Assimilation*, Reading, U.K., 123–156.
- [3] Antoulas, A.C. (Ed.), 1991: *Mathematical System Theory. The Influence of R.E. Kalman*. Springer–Verlag, 605 pp.
- [4] Apostol, T.M., 1978: *Calculus, Vol. 2*, 2nd ed. Reverté, 813 pp.
- [5] Arfken, G., 1985: *Mathematical Methods for Physicists*, 3rd ed. Academic Press, 985 pp.
- [6] Balgovind, R., A. Dalcher, M. Ghil, & E. Kalnay, 1983: A stochastic–dynamic model for the spatial structure of forecast error statistics. *Mon. Wea. Rev.*, **111**, 701–722.
- [7] Bartello, P., & H.L. Mitchell, 1992: A continuous three–dimensional model for short–range forecast error covariances. *Tellus*, **44A**, 217–235.
- [8] Bengtsson, L., M. Ghil, & E. Källén (eds.), 1981: *Dynamic Meteorology: Data Assimilation Methods*. Springer–Verlag, 330 pp.
- [9] Bennett, A.F, 1992: *Inverse Methods in Physical Oceanography*. Cambridge University Press., 346 pp.
- [10] Bergman, K.H., 1979: Multivariate analysis of temperatures and winds using optimum interpolation. *Mon. Wea. Rev.*, **107**, 1423–1444.
- [11] Bergthórsson, P., & B.R. Döös, 1955: Numerical weather map analysis. *Tellus*, **7**, 329–340.
- [12] Bierman, G.J., 1977: *Factorization Methods for Discrete Sequential Estimation*. Academic Press, 241 pp.
- [13] Bittanti, S. A.J. Laub, & J.C. Willems (Eds.), 1991: *The Riccati Equation*. Springer–Verlag, 338 pp.
- [14] Bjerknes, V., 1911: *Dynamic Meteorology and Hydrography. Part II: Kinematics*. Carnegie Institute, Gibson Bros., 175 pp.
- [15] Bochner, S., 1959: *Lectures on Fourier Integrals*. Princeton University Press, 333 pp.

- [16] Boggs, D., M. Ghil, & C. Keppenne, 1995: A stabilized sparse-matrix U-D square-root implementation of a large-state extended Kalman filter. *Proc. Intl. Symp. on Assimilation of Observations in Meteorology and Oceanography*, Tokyo, Japan, WMO, Vol. 1, 219–224.
- [17] Boyd, J.P., 1995: Eight definitions of the slow manifold: seiches, pseudoseiches and exponential smallness. *Dyn. Atmos. Oceans*, **22**, 49–75.
- [18] Brewer, J.W., 1978: Kronecker products and matrix calculus in system theory. *IEEE Trans. Circuits and Systems*, **25**, 772–781.
- [19] Brown, R.G., 1983: *Random Signal Analysis and Kalman Filtering*. John Wiley & Sons, 347 pp.
- [20] Bryson, A.E. & Y. Ho, 1975: *Optimization, Estimation and Control*. Wiley, 481 pp.
- [21] Bürger, G., & M.A. Cane, 1994: Interactive Kalman filtering. *J. Geophys. Res.*, **99**, 8015–8031.
- [22] Butkov, E., 1968: *Mathematical Physics*. Addison–Wesley Publishing Co., XXX pp.
- [23] Charney, J., R. Fjørtoft, & J. von Neumann, 1950: Numerical integration of the barotropic vorticity equation. *Tellus*, **2**, 237–254.
- [24] Christakos, G., 1992: *Random Field Models in Earth Sciences*. Academic Press, 474 pp.
- [25] Chui, C.K., & G. Chen, 1991: *Kalman Filtering with Real-Time Applications*, 2nd ed. Springer–Verlag, Vol. 17, 191 pp.
- [26] Chung, K.L. 1974: *A Course in Probability Theory*, 2nd ed. Academic Press, 365 pp.
- [27] Cohn, S.E., 1997: An introduction to estimation theory. *J. Meteor. Soc. Japan*, in press.
- [28] ———, 1993: Dynamics of short-term univariate forecast error covariances. *Mon. Wea. Rev.*, **121**, 3123–3149.
- [29] ———, 1992: Short-term dynamics of forecast error covariances. *Proc. ECMWF Workshop on Variational Assimilation*, Reading, U.K., pp. 157–170.
- [30] ———, 1982: *Methods of Sequential Estimation for Determining Initial Data in Numerical Weather Prediction*. Ph.D. Thesis, Courant Institute of Mathematical Sciences, New York University, 183 pp.
- [31] ———, & D.P. Dee, 1988: Observability of discretized partial differential equations. *SIAM J. Numer. Anal.*, **25**, 586–617.
- [32] ———, & L.L. Morone, 1984: *The effect of horizontal gradients of height–height forecast error variances upon OI forecast error statistics*. Office Note 296, National Meteorological Center, Washington DC 20233, 37 pp.
- [33] ———, & D.F. Parrish, 1991: The behavior of forecast error covariances for a Kalman filter in two dimensions. *Mon. Wea. Rev.*, **119**, 1757–1785.

- [34] ———, & R. Todling, 1996: Approximate data assimilation schemes for stable and unstable dynamics. *J. Meteor. Soc. Japan*, **74**, 63–75.
- [35] ———, N. S. Sivakumaran, & R. Todling, 1994: A fixed-lag Kalman smoother for retrospective data assimilation. *Mon. Wea. Rev.*, **122**, 2838–2867.
- [36] Courtier, P., 1997: Variational methods. M. Ghil, K. Ide, A. Bennett, P. Courtier, M. Kimoto, N. Nagata, & N. Sato (Eds.): *Data Assimilation in Meteorology and Oceanography: Theory and Practice*, Universal Academic Press, 211–218.
- [37] da Silva, A., J. Pfaendtner, J. Guo, M. Sienkiewicz, & S. E. Cohn, 1995: Assessing the effects of data selection with DAO’s physical–space statistical analysis system. *Proc. Intl. Symp. on Assimilation of Observations in Meteorology and Oceanography*, Tokyo, Japan, WMO, Vol. 1, 273–278.
- [38] Daley, R., 1995: Estimating the wind field from chemical constituent observations: Experiments with a one-dimensional extended Kalman filter. *Mon. Wea. Rev.*, **123**, 181–198.
- [39] ———, 1991: *Atmospheric Data Analysis*. Cambridge University Press, 457 pp.
- [40] ———, 1978: Variational non-linear normal mode initialization. *Tellus*, **30**, 201–218.
- [41] Dee, D.P., 1995: On-line estimation of error covariance parameters for atmospheric data assimilation. *Mon. Wea. Rev.*, **123**, 1128–1145.
- [42] ———, 1992: A simple scheme for tuning forecast error covariance parameters. *Workshop on Variational Assimilation*, Reading, England, ECMWF, 191–206.
- [43] ———, 1991: Simplification of the Kalman filter for meteorological data assimilation. *Quart. J. Roy. Meteor. Soc.*, **117**, 365–384.
- [44] ———, 1983: *Computational Aspects of Adaptive Filtering and Applications to Numerical Weather Prediction*. Ph.D. Thesis, Courant Inst. Math. Sci., New York University, 150 pp.
- [45] Eddy, A., 1964: The objective analysis of horizontal wind divergence fields. *Quart. J. Roy. Meteor. Soc.*, **90**, 424–440.
- [46] ———, 1967: The statistical objective analysis of scalar fields. *J. Appl. Meteor.*, **6**, 597–609.
- [47] Ehrendorfer, M., 1994a: The Liouville equation and its potential usefulness for the prediction of forecast skill. Part I: Theory. *Mon. Wea. Rev.*, **122**, 703–713.
- [48] ———, 1994b: The Liouville equation and its potential usefulness for the prediction of forecast skill. Part II: Applications. *Mon. Wea. Rev.*, **122**, 714–728.
- [49] Eliassen, A., 1954: *Provisional Report of Calculation of Spatial Covariance and Autocorrelation of Pressure Field*. Rept. No. 5, Institute of Weather and Climate Res., Academy of Science Oslo, 11 pp. (reprinted in Bengtsson, L., M. Ghil, & E. Källén (Eds.), pp. 319–330).
- [50] Epstein, E.S., 1969: Stochastic dynamic prediction. *Tellus*, **21**, 739–759.

- [51] Evensen, G., 1994: Sequential data assimilation with a nonlinear quasi-geostrophic model using Monte Carlo methods to forecast error statistics. *J. Geophys. Res. Oceans*, **99**, 10143–10162.
- [52] ———, 1992: Using the extended Kalman filter with a multilayer quasigeostrophic ocean model. *J. Geophys. Res.*, **97**, 17905–17924.
- [53] Fu, L.-L., I. Fukumori, & R.N. Miller, 1993: Fitting dynamic models to the Geosat sea level observations in the tropical Pacific Ocean. Part II: A linear, wind-driven model. *J. Phys. Oceanogr.*, **23**, 2162–2181.
- [54] Fukumori, I., 1995: Assimilation of TOPEX sea level measurements with a reduced-gravity, shallow water model of the tropical Pacific Ocean. *J. Geophys. Res. Oceans*, **100**, 25027–25039.
- [55] ———, & P. Malanotte-Rizzoli, 1995: An approximate Kalman filter for ocean data assimilation; an example with an idealized Gulf Stream model. *J. Geophys. Res. Oceans*, **100**, 6777–6793.
- [56] ———, J. Benveniste, C. Wunsch, & D.B. Haidvogel, 1993: Assimilation of sea surface topography into an ocean circulation model using a steady-state smoother. *J. Phys. Oceanogr.*, **23**, 1831–1855.
- [57] Gandin, L.S., 1963: *Objective Analysis of Meteorological Fields*. Gidrometeor. Izdat., Leningrad. (English translation: Israel Program for Scientific Translation, Jerusalem, 1965, 242 pp.)
- [58] ———, 1988: Complex quality control of meteorological observations. *Mon. Wea. Rev.*, **116**, 1137–1156.
- [59] Gaspari, G., & S.E. Cohn, 1996: Theory and applications of correlation function modeling on the sphere. *Math. Geology*, submitted.
- [60] Gelb, A. (Ed.), 1974: *Applied Optimal Estimation*. MIT Press, 374 pp.
- [61] Ghil, M., 1989: Meteorological data assimilation for oceanographers. Part I: description and theoretical framework. *Dyn. Atmos. Oceans*, **13**, 171–218.
- [62] ———, & S. Childress, 1987: *Topics in Geophysical Fluid Dynamics: Atmospheric Dynamics, Dynamo Theory and Climate Dynamics*. Academic Press, 485 pp.
- [63] ———, & K. Ide, 1994: Extended Kalman filtering for vortex systems: An example of observing system design. P. Brasseur & J.C.H. Nihoul (Eds.): *Data Assimilation for Modelling the Ocean in a Global Change Perspective*, Springer-Verlag, 167–193.
- [64] ———, & P. Malanotte-Rizzoli, 1991: Data assimilation in meteorology and oceanography. *Advances in Geophysics*, Vol. 33, Academic Press, 141–266.
- [65] ———, & R. Todling, 1996: Tracking atmospheric instabilities with the Kalman filter. Part II: Two-Layer Results. *Mon. Wea. Rev.*, in press.
- [66] ———, S. Cohn, J. Tavantzis, K. Bube & E. Isaacson, 1981: Applications of estimation theory to numerical weather prediction. Bengtsson, L., M. Ghil, & E. Källén (Eds.): *Dynamic Meteorology: Data Assimilation Methods*. Springer-Verlag, 139–224.

- [67] Golub, G.H., & C.F. Van Loan, 1989: *Matrix Computations*, 2nd ed. The Johns Hopkins University Press, 642 pp.
- [68] Guo, J., & A. da Silva, 1997: Computational Aspects of Goddard's Physical-Space Statistical Analysis System (PSAS). In *Numerical Simulations in the Environmental and Earth Sciences: Proceedings of the 2nd UNAM-CRAY Supercomputing Conference*, F. García-García, G. Cisneros, A. Fernández-Eguiarte, and R. Álvarez, Eds., Cambridge University Press, 203–209.
- [69] Halmos, P.R., 1958: *Finite-Dimensional Vector Spaces*, 2nd ed. D. Van Nostrand Company, Princeton, NJ, 200 pp.
- [70] Haltiner, G.J., & R.T. Williams, 1980: *Numerical Prediction and Dynamic Meteorology*. John Wiley & Sons, 477 pp.
- [71] Hao, Z., 1994: *Data Assimilation for Interannual Climate-Change Prediction*. Ph.D. Thesis, University of California, Los Angeles, 224 pp.
- [72] ———, & M. Ghil, 1995: Sequential parameter estimation for a coupled ocean-atmosphere model. *Proc. Intl. Symp. on Assimilation of Observations in Meteorology and Oceanography*, Tokyo, Japan, WMO, Vol. 1, 181–186.
- [73] Harms, D.E., S. Raman, & R.V. Madala, 1992: An examination of four-dimensional data-assimilation techniques for numerical weather prediction. *Bull. Amer. Meteor. Soc.*, **73**, 425–440.
- [74] Heckley, W.A., P. Courtier, J. Pailleux, & E. Andersson, 1993: The ECMWF variational analysis: general formulation and use of background information. *Proc. ECMWF Workshop on Variational Assimilation*, Reading, U.K., 49–94.
- [75] Heemink, A.W., 1988: Two-dimensional shallow water flow identification. *Appl. Math. Modelling*, **12**, 109–118.
- [76] ———, & H. Kloosterhuis, 1990: Data assimilation for non-linear tidal models. *Intl. J. Numer. Methods Fluids*, **11**, 1097–1112.
- [77] Hoang, H.S., P. De Mey, O. Talagrand, & R. Baraille, 1995: Assimilation of altimeter data in a multilayer quasi-geostrophic ocean model by simple nonlinear adaptive filter. *Proc. Intl. Symp. on Assimilation of Observations in Meteorology and Oceanography*, Tokyo, Japan, WMO, 521–526.
- [78] Hoffmann, G.-R., & D.F. Snelling (Eds.) 1988: *Multiprocessing in Meteorological Models*. Springer-Verlag, 438 pp.
- [79] ———, & D.K. Marettis (Eds.) 1990: *The Dawn of Massively Parallel Processing in Meteorology*. Springer-Verlag, 376 pp.
- [80] Hollingsworth, A., A.C. Lorenc, M.S. Tracton, K. Arpe, G. Cats, S. Uppala, & P. Kallberg, 1985: The response of numerical weather prediction systems to FGGE level IIb data. Part I: Analyses. *Quart. J. Roy. Meteor. Soc.*, **111**, 1–66.
- [81] Hoke, J.E., & R.A. Anthes, 1976: The initialization of numerical models by a dynamic-initialization technique. *Mon. Wea. Rev.*, **104**, 1551–1556.

- [82] Holton, J.R., 1979: *An Introduction to Dynamic Meteorology*, 2nd ed. Academic Press, 391 pp.
- [83] Householder, A.S., 1964: *The Theory of Matrices in Numerical Analysis*. Dover, 257 pp.
- [84] Jazwinski, A.H., 1970: *Stochastic Processes and Filtering Theory*. Academic Press, 376 pp.
- [85] Jiang, S., & M. Ghil, 1995: Toward monitoring the nonlinear variability of Western boundary currents — assimilation of simulated altimeter data into a wind-driven, double-gyre, shallow-water model. *Proc. Intl. Symp. on Assimilation of Observations in Meteorology and Oceanography*, Tokyo, Japan, WMO, Vol. 2, 533–538.
- [86] Kailath, T., 1974: A view of three decades of linear filtering theory. *IEEE Trans. Inform. Theory*, **20**, 146–181.
- [87] Kalman, R.E., 1960a: A new approach to linear filtering and prediction problems. *Trans. ASME, Ser. D, J. Basic. Eng.*, **82**, 35–45.
- [88] ———, 1960b: Contributions to the theory of optimal control. *Bol. Soc. Mat. Mexicana*, **5**, 102–119.
- [89] ———, 1963: New methods in Wiener filtering theory. *Proc. 1st Symp. Eng. Appl. Random Function Theory and Probability*, J.L. Bogdanoff & F. Kozin, Eds., John Wiley & Sons, 270–388.
- [90] ———, & R.S. Bucy, 1961: New Results in Linear Filtering and Prediction Theory. *Trans. ASME, Ser. D, J. Basic. Eng.*, **83**, 95–108.
- [91] Lacarra, J.–F., and O. Talagrand, 1988: Short-range evolution of small perturbations in a barotropic model. *Tellus*, **40A**, 81–95.
- [92] Le Moyne, L., & J. Alvarez, 1991: Analysis of dynamic data assimilation for atmospheric phenomena. Effect of the model order. *Atmósfera*, **4**, 145–164.
- [93] Leith, C.E., 1983: Predictability in theory and practice. In *Large-Scale Dynamical Processes in the Atmosphere*, B. Hoskins & R. Pearce, Eds. Academic Press, 391 pp.
- [94] Lewis, F.L., 1986: *Optimal Estimation with an Introduction to Stochastic Control Theory*. John Wiley & Sons, 376 pp.
- [95] Lorenc, A.C., 1981: A global three-dimensional multivariate statistical interpolation scheme. *Mon. Wea. Rev.*, **109**, 701–721.
- [96] ———, R.S. Bell, & B. MacPherson, 1991: The Meteorological Office analysis correction data assimilation scheme. *Quart. J. Roy. Meteor. Soc.*, **117**, 59–89.
- [97] ———, & O. Hammon, 1988: Objective quality control of observations using Bayesian methods. Theory and practical implementation. *Quart. J. Roy. Meteor. Soc.*, **114**, 515–543.
- [98] Lorenz, E.N., 1963: Deterministic non-periodic flow. *J. Atmos. Sci.*, **20**, 130–141.

- [99] Lorenz, E.N., 1960: Maximum simplification of dynamical equations. *Tellus*, **12**, 243–254.
- [100] Lyster, P.M., S.E. Cohn, R. Ménard, L.–P. Chang, S.–J. Lin, & R. Olsen, 1995: An Implementation of a Two-Dimensional Kalman Filter for Atmospheric Chemical Constituent Assimilation on Massively Parallel Computers. *Mon. Wea. Rev.*, submitted.
- [101] Maybeck, P.S., 1979: *Stochastic Models, Estimation, and Control*, Vol. 1. Academic Press, 423 pp.
- [102] McPherson, R.D., K.H. Bergman, R.E. Kristler, G.E. Rasch, & D.S. Gordon, 1979: The NMC operational global data assimilation system. *Mon. Wea. Rev.*, **107**, 1445–1461.
- [103] Meditch, J.S., 1969: *Stochastic Linear Estimation and Control*. McGraw–Hill Book Co., 394 pp.
- [104] Ménard, R., 1994: *Kalman Filtering of Burger’s Equation and its Application to Atmospheric Data Assimilation*. Ph.D. Thesis, McGill University, 211 pp.
- [105] ———, and R. Daley, 1996: The application of Kalman smoother theory to the estimation of 4DVAR error statistics. *Tellus*, **48A**, 221–237.
- [106] Mendel, J.M., 1971: Computational requirements for a discrete Kalman filter. *IEEE Trans. Auto. Control*, **16**, 748–758.
- [107] Miller, R.N., M. Ghil, & F. Gauthiez, 1994: Advanced data assimilation in strongly nonlinear dynamical systems. *J. Atmos. Sci.*, **51**, 1037–1056.
- [108] Øksendal, B., 1992: *Stochastic Differential Equations: An Introduction with Applications*, 3rd ed. Springer–Verlag, 224 pp.
- [109] Omatu, S., & J.H. Seinfeld, 1989: *Distributed Parameter Systems: Theory and Applications*. Oxford University Press, 430 pp.
- [110] Pailleux, J., 1990: A global variational assimilation scheme and its application for using TOVS radiances. *Proc. Intl. Symp. Assim. Obsrv. Meteorol. Oceanogr.*, Clermont–Ferrand, France, WMO, pp. 325–328.
- [111] Panofsky, H., 1949: Objective weather map analysis. *J. Meteor.*, **6**, 386–392.
- [112] Parrish, D.F., & J.C. Derber, 1992: The National Meteorological Center’s spectral statistical–interpolation analysis system. *Mon. Wea. Rev.*, **120**, 1747–1763.
- [113] ———, & S.E. Cohn, 1985: *A Kalman Filter for a Two-Dimensional Shallow-Water Model: Formulation and Preliminary Experiments*. Office Note 304, National Meteorological Center, Washington DC 20233, 64 pp.
- [114] Pedlosky, J., 1987: *Geophysical Fluid Dynamics*, Springer–Verlag, 624 pp.
- [115] Press, W.H., B.P. Flannery, S.A. Teukolsky, and W.T. Vetterling, 1989: *Numerical Recipes: The Art of Scientific Computing (FORTRAN Version)* Cambridge University Press, 702 pp.

- [116] Phillips, N.A., 1976: The impact of synoptic observing and analysis system on flow pattern forecasts. *Bull. Amer. Meteor. Soc.*, **57**, 1225–1240.
- [117] Richtmyer, R.D., & K.W. Morton, 1967: *Differential Methods for Initial Value Problems*, 2nd ed. Wiley–Interscience, 405 pp.
- [118] Riedel, K.S., 1993: Block diagonally dominant positive definite approximate filters and smoothers. *Automatica*, **29**, 779–783.
- [119] Rutherford, I.D., 1972: Data assimilation by statistical interpolation of forecast error fields. *J. Atmos. Sci.*, **29**, 809–815.
- [120] Sage, A.P, & J.L. Melsa, 1971: *System Identification*. Academic Press, 221 pp.
- [121] ———, & ———, 1970: *Estimation Theory with Applications to Communications and Control*. McGraw–Hill Book Co., 529 pp.
- [122] Saucier, W.J., 1989: *Principles of Meteorological Analysis*. Dover Publications, 438 pp.
- [123] Schlatter, T.W., 1975: Some experiments with a multivariate statistical objective analysis scheme. *Mon. Wea. Rev.*, **103**, 246–257.
- [124] ———, G.W. Branstator, L.G. Thiel, 1976: Testing a global multivariate statistical objective analysis scheme with observed data. *Mon. Wea. Rev.*, **104**, 765–783.
- [125] Stavroulakis, P. (Ed.), 1983: *Distributed Parameter Systems Theory, Part II: Estimation*. Hutchinson Ross Publ. Co., 391 pp.
- [126] Tarantola, A., 1987: *Inverse Problem Theory*, Elsevier, Amsterdam, 613 pp.
- [127] Temperton, C., 1984: Variational normal mode initialization for a multi–level model. *Mon. Wea. Rev.*, **112**, 2303–2316.
- Todling, R., 1997: Computational aspects of Kalman filtering and smoothing for atmospheric data assimilation. F. García–García, G. Cisneros, A. Fernández–Eguiarte, and R. Álvarez, Eds., Cambridge University Press, 191–202.
- [128] ———, & S.E. Cohn, 1996: Some strategies for Kalman filtering and smoothing. *Proc. ECMWF Seminar on data assimilation*, 91–111.
- [129] ———, & S.E. Cohn, 1994: Suboptimal schemes for atmospheric data assimilation based on the Kalman filter. *Mon. Wea. Rev.*, **122**, 2530–2557.
- [130] ———, & M. Ghil, 1994: Tracking atmospheric instabilities with the Kalman filter. Part I: Methodology and one–layer results. *Mon. Wea. Rev.*, **122**, 183–204.
- [131] Todling, R., S.E. Cohn, and N.S. Sivakumaran, 1998: Suboptimal schemes for retrospective data assimilation based on the fixed–lag Kalman smoother. *Mon. Wea. Rev.*, **126**, 2274–2286.
- [132] Vanmarcke, E., 1983: *Random Fields: Analysis and Synthesis*. The MIT Press, 382 pp.

- [133] Vasiljević, D., C. Cardinali, & P. Undén, 1993: ECMWF 3D variational data assimilation of conventional observations. *Proc. ECMWF Workshop on Variational Assimilation*, Reading, U.K., pp. 389–436.
- [134] Verhaegen, M. & P. Van Dooren, 1986: Numerical aspects of different Kalman filter implementations. *IEEE Trans. Auto. Control*, **31**, 907–917.
- [135] Verlaan, M. & A. W. Heemink, 1995: Reduced rank square root filters for large scale data assimilation problems. *Proc. Intl. Symp. on Assimilation of Observations in Meteorology and Oceanography*, Tokyo, Japan, WMO, Vol. 1, 247–252.
- [136] Vetter, W.J., 1970: Derivative operations on matrices. *IEEE Trans. Auto. Control*, **15**, 241–244.
- [137] ———, 1973: Matrix calculus operations and Taylor expansions. *SIAM Rev.*, **15**, 352–369.
- [138] Washington, W.M., & C.L. Parkinson, 1986: *An Introduction to Three-Dimensional Climate Modeling*. University Science Books, 422 pp.
- [139] Wiin-Nielsen, A., 1991: The birth of numerical weather prediction. *Tellus*, **43AB**, Special Issue, 36–52.
- [140] Yaglom, A.M., 1987: *Correlation Theory of Stationary and Related Random Functions, Vol 1: Basic Results*. Springer-Verlag, 526 pp.