REFERENCES

D. J. Aidely. *The Physiology of Excitable Cells*, 2nd edition, Cambridge University Press, Cambridge, 1978.

H. Akaike. A new look at the statistical model identification. *IEEE Transactions on Automatic Control*, **AC-19**:716–723, 1974.

J. Amorocho and A. Brandstetter. Determination of nonlinear functional response functions in rainfall runoff processes. *Water Resources Research*, **7**:1087–1101, 1971.

A. Anzai, I. Ohzawa, and R. D. Freeman. Neural mechanisms for processing binocular information I. simple cells. *Journal of Neurophysiology*, **82**(2):891–908, 1999.

J. F. Barrett. The use of functionals in the analysis of non-linear physical systems. *Journal of Electronics and Control*, **15**:567–615, 1963.

D. A. Baylor, M. G. F. Fuortes, and P. M. O'Bryan. Receptive fields of cones in the retina of the turtle. *Journal of Physiology*, **214**:265–294, 1971.

J. V. Beck and K. J. Arnold. *Parameter Estimation in Engineering and Science*. Wiley Series in Probability and Mathematical Statistics. John Wiley & Sons, New York, 1977.

P. Beckmann. *Orthogonal Polynomials for Engineers and Physicists*. The Golem Press, Boulder, Colorado, 1973.

J. S. Bendat and A. G. Piersol. *Random Data, Analysis, and Measurement Procedures*, 2nd edition. John Wiley & Sons, New York, 1986.

S. Boyd and L. O. Chua. Fading memory and the problem of approximating nonlinear operators with Volterra series. *IEEE Transactions on Circuits and Systems*, **CAS-32**(11):1150–1161, 1985.

D. R. Brillinger. *Time Series Data Analysis and Theory*. Holt, Rhinehart & Winston, New York, 1975.

J. J. Bussgang. Crosscorrelation Functions of Amplitude-Distorted Gaussian Signals. Technical Report 216, MIT Electrical Research Lab, 1952.

P. E. Caines. *Linear Stochastic Systems*. John Wiley & Sons, New York, 1988.

L. H. Carney and M. Friedman. Nonlinear feedback models for the tuning of auditory nerve fibers. *Annals of Biomedical Engineering*, **24**:440–450, 1996.

K. H. Chon, Y. M. Chen, N.-H. Holstein-Rathlou, and V. Z. Marmarelis. Nonlinear system analysis of renal autoregulation in normotensive and hypertensive rats. *IEEE Transactions on Biomedical Engineering*, **45**(3):342–353, 1998.

K. H. Chon, T. J. Mullen, and R. J. Cohen. A dual-input nonlinear system analysis of autonomic modulation of heart rate. *IEEE Transactions on Biomedical Engineering*, **43**(5):530–544, 1996.

M. C. Citron, R. C. Emerson, and W. R. Levick. Nonlinear measurement and classification of receptive fields in cat retinal ganglion cells. *Annals of Biomedical Engineering*, **16**:65–77, 1988.

P. E. Crago. Muscle input-output model: The static dependence of force on length, recruitment, and firing period. *IEEE Transactions of Biomedical Engineering*, **39**(8):871–874, 1992.

A. D'Aguanno, B. L. Bardakjian, and P. L. Carlen. Passive neuronal membrane parameters: Comparison of optimization and peeling methods. *IEEE Transactions on Biomedical Engineering*, **33**(12):1188–1196, 1986.

E. de Boer and P. Kuyper. Triggered correlation. *IEEE Transactions on Biomedical Engineering*, **15**:169–179, 1968.

J. J. Eggermont. Wiener and Volterra analyses applied to the auditory system. *Hearing Research*, **66**:177–201, 1993.

A. S. French. Practical nonlinear system analysis by Wiener kernel estimation in the frequency domain. *Biological Cybernetics*, **24**:111–119, 1976.

A. S. French and E. G. Butz. Measuring the Wiener kernels of a non-linear system using the fast Fourier transform algorithm. *International Journal of Control*, **17**:529–539, 1973.

A. S. French and M. J. Korenberg. A nonlinear cascade model for action potential encoding in an insect sensory neuron. *Biophysical Journal*, **55**:655–661, 1989.

A. S. French and M. J. Korenberg. Dissection of a nonlinear cascade model for sensory encoding. *Annals of Biomedical Engineering*, **19**:473–484, 1991.

A. S. French, M. J. Korenberg, M. Jarvilehto, E. Kouvalainen, M. Juusola, and M. Weckstrom. The dynamic nonlinear behaviour of fly photoreceptors evoked by a wide range of light intensities. *Biophysical Journal*, **65**:832–839, 1993.

A. S. French and V. Z. Marmarelis. Nonlinear neuronal mode analysis of action potential encoding an the cockroach tactile spine neuron. *Biological Cybernetics*, **73**:425–430, 1995.

A. S. French and S. K. Patrick. A nonlinear model of step responses in the cockroach tactile spine neuron. *Biological Cybernetics*, **70**:435–441, 1994.

A. S. French, S.-I. Sekizawa, U. Hölger, and P. H. Torkkeli. Predicting the responses of mechanoreceptor neurons to physiological inputs by nonlinear system identification. *Annals of Biomedical Engineering*, **29**:187–194, 2001.

H. L. Galiana, H. L. Smith, and A. Katsarkas. Comparison of linear vs. nonlinear methods for analyzing the vestibulo-ocular reflex (VOR). *Acta Oto-Laryngologica*, **115**(5):585–596, 1995.

H. L. Galiana, H. L. H. Smith, and A. Katsarkas. Modelling non-linearities in the vestibule-ocular reflex (VOR) after unilateral or bilateral loss of peripheral vestibular function. *Experimental Brain Research*, **137**:369–386, 2001.

G. Golub and C. Van Loan. *Matrix Computations*. Johns Hopkins University Press, Baltimore, 2nd edition, 1989.

Y. Goussard, W. C. Krenz, and L. Stark. An improvement of the Lee and Schetzen cross-correlation method. *IEEE Transactions on Automatic Control*, **30**(9):895–898, 1985.

W. J. Heetderks and W. J. Williams. Partition of gross peripheral nerve activity into single unit responses by correlation techniques. *Science*, **188**:373–375, 1975.

J. H. Holland. *Adaptation in Natural and Artificial Systems*. University of Michigan Press, Ann Arbor, MI, 1975. Reprinted by MIT Press, 1992.

K. J. Hunt, M. Munih, N. N. Donaldson, and F. M. D. Barr. Investigation of the Hammerstein hypothesis in the modeling of electrically stimulated muscle. *IEEE Transactions on Biomedical Engineering*, **45**(8):998–1009, 1998.

I. W. Hunter and R. E. Kearney. Two-sided linear filter identification. *Medical and Biological Engineering and Computing*, **21**:203–209, 1983.

I. W. Hunter and M. J. Korenberg. The identification of nonlinear biological systems: Wiener and Hammerstein cascade models. *Biological Cybernetics*, **55**:135–144, 1986.

M. Juusola and A. S. French. Visual acuity for moving objects in first- and second-order neurons of the fly compound eye. *Journal of Neurophysiology*, **77**:1487–1495, 1997.

M. Juusola, M. Weckstrom, R. O. Uusitalo, M. J. Korenberg, and A. S. French. Nonlinear models of the first synapse in the light-adapted fly retina. *Journal of Neurophysiology*, **74**(6):2538–2547, 1995.

T. Kailath. *Linear Systems*. Prentice-Hall, Englewood Cliffs, NJ, 1980.

E. W. Kamen. *Introduction to Signals and Systems*, 2nd edition. Macmillan, New York, 1990.

R. E. Kearney and I. W. Hunter. System identification of human triceps surae stretch reflex dynamics. *Experimental Brain Research*, **51**:117–127, 1983.

R. E. Kearney and I. W. Hunter. System identification of human stretch reflex dynamics: Tibialis anterior. *Experimental Brain Research*, **56**:40–49, 1984.

R. E. Kearney and I. W. Hunter. Nonlinear identification of stretch reflex dynamics. *Annals of Biomedical Engineering*, **16**:79–94, 1988.

R. E. Kearney and I. W. Hunter. System identification of human joint dynamics. *CRC Critical Reviews in Biomedical Engineering*, **18**:55–87, 1990.

R. E. Kearney, I. W. Hunter, P. L. Weiss, and K. Spring. Tilt-table/ankle-actuator system for the study of vestibulospinal reflexes. *Medical and Biological Engineering and Computing*, **21**:301–305, 1983.

R. E. Kearney, R. B. Stein, and L. Parameswaran. Identification of intrinsic and reflex contributions to human ankle stiffness dynamics. *IEEE Transactions on Biomedical Engineering*, **44**(6):493–504, 1997.

R. E. Kearney and D. T. Westwick. NLID a MATLAB toolbox for nonlinear system identification. http://www.bmed.mcgill.ca, 2003.

M. C. K. Khoo. *Physiological Control Systems*. IEEE Press, Piscataway, NJ, 2000.

S. Kirkpatrick, C. D. Gellatt, and M. P. Vecchi. Optimization by simulated annealing. *Science*, **220**:671–680, 1983.

Y. Kondoh, T. Arima, J. Okuma, and Y. Hasegawa. Response dynamics and directional properties of nonspiking local interneurons in the cockroach cercal system. *Journal of Neuroscience*, **13**:2287–2305, 1993.

Y. Kondoh, Y. Hasegawa, J. Okuma, and F. Takahashi. Neural computation of motion in the fly visual system: Quadratic nonlinearity of responses induced by picrotoxin in the hs and ch cells. *Journal of Neurophysiology*, **74**(6):2665–2684, 1995.

M. J. Korenberg. Statistical identification of parallel cascades of linear and nonlinear systems. In *Identification and System Parameter Estimation*, Volume 1. International Federation of Automatic Control, 1982, pages 669–674.

M. J. Korenberg. Functional expansions, parallel cascades, and nonlinear difference equations. In V. Z. Marmarelis, editor. *Advanced Methods of Physiological System Modelling*, Volume 1. Biomedical Simulations Resource, USC-LA, Los Angeles, 1987, pages 221–240.

M. J. Korenberg. Identifying nonlinear difference equation and functional expansion representations: The fast orthogonal algorithm. *Annals of Biomedical Engineering*, **16**:123–142, 1988.

M. J. Korenberg. Parallel cascade identification and kernel estimation for nonlinear systems. *Annals of Biomedical Engineering*, **19**:429–455, 1991.

M. J. Korenberg, S. B. Bruder, and P. J. McIlroy. Exact orthogonal kernel estimation from finite data records: Extending Wiener's identification of nonlinear systems. *Annals of Biomedical Engineering*, **16**:201–214, 1988a.

M. J. Korenberg, A. S. French, and S. K. L. Voo. White-noise analysis of nonlinear behavior in an insect sensory neuron: Kernel and cascade approaches. *Biological Cybernetics*, **58**:313–320, 1988b.

M. J. Korenberg and I. W. Hunter. The identification of nonlinear biological systems: LNL cascade models. *Biological Cybernetics*, **55**:125–134, 1986.

M. J. Korenberg and I. W. Hunter. The identification of nonlinear biological systems: Wiener kernel approaches. *Annals of Biomedical Engineering*, **18**:629–654, 1990.

M. J. Korenberg and I. W. Hunter. The identification of nonlinear biological systems: Volterra kernel approaches. *Annals of Biomedical Engineering*, **24**:250–268, 1996. Corrected version appears in Vol. 24, No. 4.

M. J. Korenberg and I. W. Hunter. Two methods for identifying Wiener cascades having noninvertible static nonlinearities. *Annals of Biomedical Engineering*, **27**(6):793–8004, 1999.

M. J. Korenberg and L. D. Paarmann. Applications of fast orthogonal search: Time-series analysis and resolution of signals in noise. *Annals of Biomedical Engineering*, **17**:219–231, 1989.

Y. W. Lee and M. Schetzen. Measurement of the Wiener kernels of a non-linear system by cross-correlation. *International Journal of Control*, **2**:237–254, 1965.

L. Ljung. *System Identification: Theory for the User*, 2nd edition. Prentice-Hall, Upper Saddle River, NJ, 1999.

B. Lutchen, and K. R. Suki. Understanding pulmonary mechanics using the forced oscillations technique. In *Bioengineering Approaches to Pulmonary Physiology and Medicine*, pages 227–253. Plenum Press, New York, 1996.

G. N. Maksym and J. H. T. Bates. Nonparametric block-structured modeling of rat lung dynamics. *Annals of Biomedical Engineering*, **25**(6):1000–1008, 1997.

G. N. Maksym, R. E. Kearney, and J. H. T. Bates. Nonparametric block-structured modeling of lung tissue strip mechanics. *Annals of Biomedical Engineering*, **26**(2):242–252, 1998.

P. Z. Marmarelis and V. Z. Marmarelis. *Analysis of Physiological Systems*. Plenum Press, New York, 1978.

P. Z. Marmarelis and K. I. Naka. Identification of multi-input biological systems. *IEEE Transactions on Biomedical Engineering*, **BME-21**:88–101, 1974.

V. Z. Marmarelis and S. H. Courellis. Lysis 7.1 http://bmsr.usc.edu/Software/Lysis/lysismenu.html, 2003.

V. Z. Marmarelis. Nonlinear and nonstationary modeling of physiological systems: An overview. In V. Z. Marmarelis, editor. *Advanced Methods of Physiological System Modelling*, Volume 1. Biomedical Simulations Resource, USC-LA, Los Angeles, 1987, pages 1–24.

V. Z. Marmarelis. Signal transformation and coding in neural systems. *IEEE Transactions on Biomedical Engineering*, **36**(1):15–24, 1989.

V. Z. Marmarelis. Identification of nonlinear biological systems using Laguerre expansions of kernels. *Annals of Biomedical Engineering*, **21**(6):573–589, 1993.

V. Z. Marmarelis. Nonlinear modeling of physiological systems using principal dynamic modes. In V. Z. Marmarelis, editor. *Advanced Methods of Physiological System Modeling*, Volume 3. Plenum Press, New York, 1994, pages 1–27.

V. Z. Marmarelis. Modeling methodology for nonlinear physiological systems. *Annals of Biomedical Engineering*, **25**:239–251, 1997.

V. Z. Marmarelis, K. H. Chon, Y. M. Chen, D. J. Marsh, and N. H. Holstein-Rathlou. Nonlinear analysis of renal autoregulation under broadband forcing conditions. *Annals of Biomedical Engineering*, **21**(6):591–603, 1993.

V. Z. Marmarelis, K. H. Chon, N. H. Holstein-Rathlou, and D. J. Marsh. Nonlinear analysis of renal autoregulation in rats using principal dynamic modes. *Annals of Biomedical Engineering*, **27**(1):23–31, 1999.

V. Z. Marmarelis and M. E. Orme. Modeling of neuronal systems by use of neuronal modes. *IEEE Transactions on Biomedical Engineering*, **40**(11):1149–1158, 1993.

V. Z. Marmarelis and X. Zhao. On the relation between Volterra models and feedforward artificial neural networks. In V. Z. Marmarelis, editor. *Advanced Methods of Physiological System Modeling*, Volume 3. Plenum Press, New York, 1994, pages 243–259.

V. Z. Marmarelis and X. Zhao. Volterra models and three-layer perceptrons. *IEEE Transactions on Neural Networks*, **8**(6):1421–1433, 1997.

L. Mo and N. Elkasabgy. Elec-841 report. Technical report, Queens's University, Department of Electrical Engineering, Kingston, Ontario, Canada, 1984.

M. Munih, K. Hunt, and N. Donaldson. Variation of recruitment nonlinearity and dynamic response of ankle plantarflexors. *Medical Engineering and Physics*, **22**(2):97–107, 2000.

K.-I. Naka, H. M. Sakai, and I. Naohiro. Generation and transformation of second-order nonlinearity in catfish retina. *Annals of Biomedical Engineering*, **16**:53–64, 1988.

K. Ogata. *Discrete-Time Control Systems*. Prentice-Hall, Englewood Cliffs, NJ, 1995.

H. Ogura. Estimation of Wiener kernels of a nonlinear system and fast algorithm using digital Laguerre filters. In *15th NIBB Conference*, 1986, pages 14–62.

Y. Okuma and J. Kondoh. Neural circuitry underlying linear representation of wind information in a nonspiking local interneuron of the cockroach. *Journal of Comparative Physiology A—Sensory Neural and Behavioral Physiology*, **179**(6):725–740, 1996.

A. V. Oppenheim and R. W. Schafer. *Discrete-Time Signal Processing*. Prentice-Hall, Englewood Cliffs, NJ, 1989.

G. Palm. On representation and approximation of nonlinear systems. *Biological Cybernetics*, **34**:49–52, 1979.

A. Papoulis. *Probability, Random Variables and Stochastic Processes*, 2nd edition. McGraw Hill, New York, 1984.

M. G. Paulin. A method for constructing data-based models of spiking neurons using a dynamic linear-static nonlinear cascade. *Biological Cybernetics*, **69**:67–76, 1993.

D. B. Percival and A. T. Walden. *Spectral Analysis for Physical Applications*. Cambridge University Press, Cambridge, 1993.

R. R. Pfeiffer. A model for two-tone inhibition for single cochlear nerve fibres. *Journal of the Acoustical Society of America*, **48**:1373–1378, 1970.

A. V. Poliakov, R. R. K. Powers, and M. D. Binder. Functional identification of the input-output transforms of motoneurones in the rat and cat. *Journal of Physiology*, **504**(2):401–424, 1997.

W. H. Press, S. A. Teukolsky, W. T. Vetterling, and B. P. Flannery. *Numerical Recipes in C: The Art of Scientific Computing*, 2nd edition. Cambridge University Press, Cambridge, 1992.

R. Rojas. *Neural networks, A Systematic Introduction*. Springer-Verlag, Berlin, 1996.

W. J. Rugh. *Nonlinear System Theory, The Volterra/Wiener Approach*. Johns Hopkins University Press, Baltimore, 1981.

H. M. Sakai. White-noise analysis in neurophysiology. *Physiological Reviews*, **72**(2):491–505, 1992.

H. M. Sakai, H. Machuca, and K.-I. Naka. Processing of color- and noncolor-coded signals in the gourami retina. I. horizontal cells. *Journal of Neurophysiology*, **78**(4):2002–2017, 1997.

M. Sakuranaga, Y.-I. Ando, and K.-I. Naka. Signal transmission in the catfish retina. I. Transmission in the outer retina. *Journal of Neurophysiology*, **53**:373–389, 1985a.

M. Sakuranaga, Y.-I. Ando, and K.-I. Naka. Signal transmission in the catfish retina. II. Transmission to type N cell. *Journal of Neurophysiology*, **53**:390–410, 1985b.

M. Sakuranaga, Y.-I. Ando, and K.-I. Naka. Signal transmission in the catfish retina. III. Transmission to type C cell. *Journal of Neurophysiology*, **53**:411–428, 1985c.

M. Sakuranaga, S. Sato, E. Hida, and K.-I. Naka. Nonlinear analysis: Mathematical theory and biological applications. *CRC Critical Reviews in Biomedical Engineering*, **14**:127–184, 1986.

M. Schetzen. Measurement of the kernels of a nonlinear system by crosscorrelation. *MIT Electronics Research Lab: Quarterly Progress Report*, **60**:118–130, 1961a.

M. Schetzen. Measurement of the kernels of a nonlinear system by crosscorrelation with Gaussian non-white inputs. *MIT Electronics Research Lab: Quarterly Progress Report*, **63**:113–117, 1961b.

M. Schetzen. *The Volterra and Wiener Theories of Nonlinear Systems*. John Wiley & Sons, New York, 1980.

M. Schetzen. Nonlinear system modeling based on the Wiener theory. *Proceedings of the IEEE*, **69**:1557–1573, 1981.

G. A. F. Seber. *Linear Regression Analysis*. John Wiley & Sons, New York, 1977.

Y. Shi and K. E. Hecox. Nonlinear system identification by m-pulse sequences: Application to brainstem auditory evoked responses. *IEEE Transactions on Biomedical Engineering*, **38**:834–845, 1991.

E. J. Simon. Two types of luminosity horizontal vells in the retina of the turtle. *Journal of Physiology*, **230**:199–211, 1973.

T. Söderström and P. Stoica. *System Identification*. Prentice-Hall, New York, 1989.

C. Swerup. On the choice of noise for the analysis of the peripheral auditory system. *Biological Cybernetics*, **29**:97–104, 1978.

V. Volterra. *Theory of functionals and of integral and integro-differential equations*. Dover, New York, 1959.

D. T. Westwick and R. E. Kearney. Identification of multiple-input nonlinear systems using non-white test signals. In V. Z. Marmarelis, editor. *Advanced Methods of Physiological System Modeling*, Volume 3. Plenum Press, New York, 1994, pages 163–178.

D. T. Westwick and R. E. Kearney. Generalized eigenvector algorithm for nonlinear system identification with non-white inputs. *Annals of Biomedical Engineering*, **25**(5):802–814, 1997.

D. T. Westwick and R. E. Kearney. Nonparametric identification of nonlinear biomedical systems, part I: Theory. *Critical Reviews in Biomedical Engineering*, **26**(3):153–226, 1998.

D. T. Westwick and R. E. Kearney. Separable least squares identification of nonlinear Hammerstein models: Application to stretch reflex dynamics. *Annals of Biomedical Engineering*, **29**(8):707–718, August 2001.

D. T. Westwick and K. R. Lutchen. Fast, robust identification of nonlinear physiological systems using an implicit basis expansion. *Annals of Biomedical Engineering*, **28**(9):1116–1125, 2000.

N. Wiener. *Nonlinear Problems in Random Theory*. Technology Press Research Monographs. John Wiley & Sons, New York, 1958.

H. Yuan, D. T. Westwick, E. P. Ingenito, K. R. Lutchen, and B. Suki. Parametric and nonparametric nonlinear system identification of lung tissue strip mechanics. *Annals of Biomedical Engineering*, **27**(4):548–562, 1999.

L. Q. Zhang and W. Z. Rymer. Simultaneous and nonlinear identification of mechanical and reflex properties of human elbow joint muscles. *IEEE Transactions on Biomedical Engineering*, **44**(12):1192–1209, 1997.

Q. Zhang, K. R. Lutchen, and B. Suki. A frequency domain approach to nonlinear and structure identification for long memory systems: Application to lung mechanics. *Annals of Biomedical Engineering*, **27**(1):1–13, 1999.