[191] Jabri, M., and B. Flower. Weight perturbation: An optimal architecture and learning technique for analog VLSI feedforward and recurrent multilayer networks. *Neural Computation* 3(4):546–565, 1991.

[192] Jabri, M.A., and B. Flower. Weight perturbation: An optimal architecture and learning technique for analog VLSI feedforward and recurrent multilayer networks. *IEEE Transactions on Neural Networks* 3(1):154–157, 1992.

[193] Jacobs, R.A. Initial experiments on constructing domains of expertise and hierarchies in connectionist systems. In D. Touretzky, G. Hinton, and T. Sejnowski, editors, *Proceedings of the 1988 Connectionist Models Summer School*, pp. 144–1153. Morgan Kaufmann, San Mateo, 1988.

[194] Jacobs, R.A. Increased rates of convergence through learning rate adaptation. *Neural Networks* 1(4):295–307, 1988.

[195] Ji, C., R.R. Snapp, and D. Psaltis. Generalizing smoothness constraints from discrete samples. *Neural Computation* 2(2):188–197, 1990.

[196] Jia, Q., K. Hagiwara, N. Toda, and S.Usui. Equivalence relation between the backpropagation learning process of an FNN and that of an FNNG. *Neural Networks* 7(2):411, 1994.

[197] Johansson, E.M., F.U. Dowla, and D.M. Goodman. Backpropagation learning for multilayer feed-forward neural networks using the conjugate gradient method. *International Journal of Neural Systems* 2(4):291–301, 1991.

[198] Jordan, F., and G. Clement. Using the symmetries of a multi-layered network to reduce the weight space. In *Proceedings of the International Joint Conference on Neural Networks (Seattle)*, vol. 2, pp. 391–396. IEEE, New York, 1991.

[199] Jordan, M.I. Constrained supervised learning. Journal of Mathematical Psychology 36(3):396–425, 1992.

[200] Jordan, M.I., and R.A. Jacobs. Modularity, unsupervised learning, and supervised learning. In S. Davis, editor, *Connectionism: Theory and Practice*, pp. 21–29. Oxford University Press, Oxford, 1992.

[201] Jordan, M.I., and D.E. Rumelhart. Forward models: Supervised learning with a distal teacher. *Cognitive Science* 16(3):307–354, 1992.

[202] Judd, J.S., editor. Neural Network Design and the Complexity of Learning. MIT Press, Cambridge, 1990.

[203] Judd, S. Learning in neural networks. In D. Haussler and L. Pitt, editors, *Proceedings of the 1988 Workshop on Computational Learning Theory*, pp. 2–8. Morgan Kaufmann, San Mateo, 1988.

[204] Judd, S. On the complexity of loading shallow neural networks. *Journal of Complexity* 4(3):177–192, 1988.

[205] Kamimura, R., T. Takagi, and S. Nakanishi. Improving generalization performance by information minimization. In *IEEE International Conference on Neural Networks (Orlando)*, pp. 143–147. IEEE, New York, 1994.

[206] Kandel, E.R., and J.H. Schwartz, editors. *Principles of Neural Science*, 2nd edition. Elsevier, New York, 1985.

[207] Karnin, E.D. A simple procedure for pruning back-propagation trained neural networks. *IEEE Transactions on Neural Networks* 1(2):239–242, 1990.

[208] Kasparian, V., C. Batur, H. Zhang, and J. Padovan. Davidon least squares based learning algorithm for feedforward neural networks. *Neural Networks* 7(4):661–670, 1994.

[209] Keesing, R., and D. G. Stork. Evolution and learning in neural networks: The number and distribution of learning trials affect the rate of evolution. In R.P. Lippmann, J.E. Moody, and D.S Touretzky, editors, *Advances in Neural Information Processing (Denver)* (3), pp. 804–810. Morgan Kaufmann, San Mateo, 1991.

[210] Kinsella, J.A. Comparison and evaluation of variants of the conjugate gradient method for efficient learning in feed-forward neural networks with backward error propagation. *Network: Computation in Neural Systems* 3(1):27–35, 1992.

[211] Kirkpatrick, S., C.D. Gelatt Jr., and M.P. Vecchi. Optimization by simulated annealing. *Science* 220:671–680, 1983 (reprinted in J.A. Anderson and E. Rosenfeld, editors, *Neurocomputing*, MIT Press, Cambridge, 1988).

[212] Kohonen, T. Self-Organization and Associative Memory, vol. 8 of Springer Series in Information Sciences, 2nd edition. Springer-Verlag, Berlin, 1988.

[213] Koiran, P., and E.D. Sontag. Neural networks with quadratic VC dimension. In D.S. Touretsky, M.C. Mozer, and M.E. Hasselmo, editors, *Advances in Neural Information Processing Systems* (8), pp. 197–203. MIT Press, Cambridge, 1996.

[214] Koistinen, P., and L. Holmström. Kernel regression and backpropagation training with noise. In *Proceedings* of the International Joint Conference on Neural Networks (Singapore), pp. 367–372. IEEE, New York, 1991.

[215] Koistinen, P., and L. Holmström. Kernel regression and backpropagation training with noise. In J.E. Moody, S.J. Hanson, and R.P. Lippmann, editors, *Advances in Neural Information Processing Systems* (4), pp. 1035–1039. Morgan Kaufmann, San Mateo, 1992.

[216] Kolen, J.F., and J.B. Pollack. Backpropagation is sensitive to initial conditions. *Complex Systems* 4(3):269–280, 1990.

[217] Kolen, J.F., and J.B. Pollack. Back propagation is sensitive to initial conditions. In *Advances in Neural Information Processing Systems* (3), pp. 860–867. Morgan Kaufmann, San Mateo, 1991.

[218] Kollias, S., and D. Anastassiou. An adaptive least squares algorithm for the efficient training of multilayered networks. *IEEE Transactions on Circuits and Systems* 36:1092–1101, 1989.

[219] Kolmogorov, A.N. On the representation of continuous functions of several variables by superpositions of continuous functions of one variable and addition. *Doklady Akademii Nauk SSSR* 114(5):953–956, 1957 (in Russian).

[220] Kolmogorov, A.N. On the representation of continuous functions of several variables by superpositions of continuous functions of one variable and addition. *American Mathematical Society Translations* 28:55–59, 1963.

[221] Koza, J. Genetic Programming. MIT Press, Cambridge, 1992.

[222] Koza, J.R. A genetic approach to the truck backer upper problem and the inter-twined spiral problem. In *Proceedings of the International Joint Conference on Neural Networks (Baltimore)*, vol. 4, pp. 310–318. IEEE, New York, 1992.

[223] Koza, J.R., and M.A. Keane. Cart centering and broom balancing by genetically breeding populations of control strategy programs. In *Proceedings of the International Joint Conference on Neural Networks (San Diego)*, vol. 1, p. 198. IEEE, New York, 1990.

[224] Koza, J.R., and J.P. Rice. Genetic generation of both the weights and architecture for a neural network. In *Proceedings of the International Joint Conference on Neural Networks (Seattle)*, vol. 2, p. 397. IEEE, New York, 1991.

[225] Kramer, A.H., and A. Sangiovanni-Vincentelli. Efficient parallel learning algorithms for neural networks. In *Advances in Neural Information Processing Systems* (1), pp. 40–48. Morgan Kaufmann, San Mateo, 1989.

[226] Kreinovich, V.Y. Arbitrary nonlinearity is sufficient to represent all functions by neural networks: A theorem. *Neural Networks* 4(3):381–383, 1991.

[227] Krogh, A., and J.A. Hertz. A simple weight decay can improve generalization. In J.E. Moody, S.J. Hanson, and R.P. Lippmann, editors, *Advances in Neural Information Processing Systems* (4), pp. 950–957. Morgan Kaufmann, San Mateo, 1992.

[228] Kruschke, J.K. Creating local and distributed bottlenecks in hidden layers of back-propagation networks. In D. Touretzky, G. Hinton, and T. Sejnowski, editors, *Proceedings of the 1988 Connectionist Models Summer School*, pp. 120–126, Morgan Kaufmann, San Mateo, 1989.

[229] Kruschke, J.K. Improving generalization in back-propagation networks with distributed bottlenecks. In *Proceedings of the International Joint Conference on Neural Networks (Washington, D.C.)*, vol. 1, pp. 443–447. IEEE, New York, 1989.

[230] Kruschke, J.K., and J.R. Movellan. Benefits of the gain: Speeded learning and minimal hidden layers in back-propagation networks. *IEEE Transactions on Systems, Man, and Cybernetics* 21(1):273–280, 1991.

[231] Kurkova, V. Kolmogorov's theorem and multilayer neural networks. Neural Networks 5(3):501-506, 1992.

[232] Kurkova, V., and P.C. Kainen. Functionally equivalent feedforward neural networks. *Neural Computation* 6(3):544–558, 1994.

[233] Lang, K.J., and M.J. Witbrock. Learning to tell two spirals apart. In D. Touretzky, G. Hinton, and T. Sejnowski, editors, *Proceedings of the 1988 Connectionist Models Summer School*, pp. 52–59. Morgan Kaufmann, San Mateo, 1989.

[234] Lapedes, A., and R. Farber. How neural nets work. In D. Anderson, editor, *Neural Information Processing Systems (Denver 1987)*, pp. 442–456. American Institute of Physics, New York, 1988.

[235] Lari-Najafi, H., M. Nasiruddin, and T. Samad. Effect of initial weights on back-propagation and its variations. In *IEEE International Conference on Systems, Man, and Cybernetics*, vol. 1, pp. 218–219. IEEE, New York, 1989.

[236] Le Cun, Y. Generalization and network design strategies. Technical Report CRG-TR-89-4, University of Toronto, Department of Computer Science, 1989.

[237] Lee, J., and Z. Bien. Improvement of function approximation capability of backpropagation neural networks. In *Proceedings of the International Joint Conference on Neural Networks (Singapore)*, vol. 2, pp. 1367– 1372. IEEE, New York, 1991.

[238] Lee, J.S.-J., J.-N. Hwang, D.T. Davis, and A.C. Nelson. Integration of neural networks and decision tree classifiers for automated cytology screening. In *Proceedings of the International Joint Conference on Neural Networks (Seattle)*, vol. 1, pp. 257–262. IEEE, New York, 1991.

[239] Lee, Y., and R.P. Lippmann. Practical characteristics of neural network and conventional pattern classifiers on artificial and speech problems. In *Advances in Neural Information Processing Systems* (2), pp. 168–177. Morgan Kaufmann, San Mateo, 1990.

[240] Lee, Y., S.-H. Oh, and M.W. Kim. The effect of initial weights on premature saturation in back-propagation learning. In *Proceedings of the International Joint Conference on Neural Networks (Seattle)*, vol. 1, pp. 765–770. IEEE, New York, 1991.

[241] Lee, Y., S.-H. Oh, and M.W. Kim. An analysis of premature saturation in back propagation learning. *Neural Networks* 6(5):719–728, 1993.

[242] Levin, A.U., T.K. Leen, and J.E. Moody. Fast pruning using principal components. In J.D. Cowan, G. Tesauro, and J. Alspector, editors, *Advances in Neural Information Processing Systems* (6), pp. 35–42. Morgan Kaufmann, San Mateo, 1994.

[243] Levin, E., N. Tishby, and S.A. Solla. A statistical approach to learning and generalization in layered neural networks. *Proceedings of the IEEE* 78(10):1568–1574, Oct. 1990.

[244] Lin, J.-N., and R. Unbehauen. On the realization of a Kolmogorov network. *Neural Computation* 5(1):18–20, 1993.

[245] Lincoln, W.P., and J. Skrzypek. Synergy of clustering multiple backpropagation networks. In D.S. Touretzky, editor, *Advances in Neural Information Processing Systems (Denver, 1989)* (2), pp. 650–657. Morgan Kaufmann, San Mateo, 1990.

[246] Linden, A., and J. Kindermann. Inversion of multilayer nets. In *Proceedings of the International Joint Conference on Neural Networks (Washington D.C.)*, vol. 2, pp. 425–430. IEEE, New York, 1989.

[247] Lippmann, R.P. An introduction to computing with neural nets. ASSP Magazine, pp. 4–22. April 1987.

[248] Littmann, E., and H. Ritter. Cascade network architectures. In *Proceedings of the International Joint Conference on Neural Networks (Baltimore)*, pp. 398–404. IEEE, New York, 1992.

[249] Lui, H.C. Analysis of decision contour of neural network with sigmoidal nonlinearity. In *Proceedings of the International Joint Conference on Neural Networks (Washington, D.C.)*, pp. 655–658. IEEE, New York, 1990.

[250] Maass, W., G. Schnitger, and E.D. Sontag. On the computational power of sigmoid versus boolean threshold circuits. In *Proceedings of the 32nd Annual Symp. on Foundations of Computer Science*, pp. 767–776. IEEE Computer Society Press, Los Alamitos, CA, 1991.

[251] MacKay, D.J.C. Bayesian interpolation. Neural Computation 4(3):415-447, 1992.

[252] MacKay, D.J.C. The evidence framework applied to classification networks. *Neural Computation* 4(5):720–736, 1992.

[253] MacKay, D.J.C. A practical Bayesian framework for backpropagation networks. *Neural Computation* 4(3):448–472, 1992.

[254] Makhoul, J. Pattern recognition properties of neural networks. In B.H. Juang, S.Y. Kung, and C.A. Kamm, editors, *Neural Networks for Signal Processing: Proceedings of the 1991 IEEE Workshop*, pp. 173–187. IEEE Press, New York, 1991.

[255] Makhoul, J., A. El-Jaroudi, and R. Schwartz. Formation of disconnected decision regions with a single hidden layer. In *Proceedings of the International Joint Conference on Neural Networks (Washington D.C.)*, vol. 1, pp. 455–460. IEEE, New York, 1989.

[256] Marchand, M., M. Golea, and P. Ruján. A convergence theorem for sequential learning in two-layer perceptrons. *Europhysics Letters* 11(6):487–492, 1990.

[257] Marks, R.J., II. Introduction to Shannon Sampling and Interpolation Theory. Springer-Verlag, New York, 1991.

[258] Masters, T., editor. Advanced Algorithms for Neural Networks, A C++ Sourcebook. Wiley, New York, 1995.

[259] Matsuoka, K. An approach to generalization problem in back-propagation learning. In *International Neural Network Conference (Paris)*, 2:765–768, 1990.

[260] Matsuoka, K. Noise injection into inputs in back-propagation learning. *IEEE Transactions on Systems, Man, and Cybernetics* 22(3):436–440, 1992.

[261] McClelland, J.L., and D.E. Rumelhart. Training hidden units: The generalized delta rule. In *Explorations in Parallel Distributed Processing: A Handbook of Models, Programs, and Exercises*, pp. 121–160. MIT Press, Cambridge, 1988.

[262] McInerney, J.M., K.G. Haines, S. Biafore, and R. Hecht-Nielsen. Can back propagation error surfaces have non-global minima? Technical report, Department of Electrical and Computer Engineering, University of California at San Diego, August 1988.

[263] McInerney, J.M., K.G. Haines, S. Biafore, and R. Hecht-Nielsen. kack propagation error surfaces can have local minima. In *Proceedings of the International Joint Conference on Neural Networks (Washington, D.C.)*, vol. 3, pp. 627, 1989 (abstract).

[264] Metropolis, N., A.W. Rosenbluth, M.N. Rosenbluth, A.H. Teller, and E. Teller. Equations of state calculations by fast computing machines. *Journal of Chemistry and Physics* 21:1087–1091, 1953.

[265] Mézard, M., and J.-P. Nadal. Learning in feedforward layered networks: The tiling algorithm. *Journal of Physics A* 22:2191–2203, 1989.

[266] Minai, A.A., and R.D. Williams. Acceleration of back-propagation through learning rate and momentum adaptation. In *Proceedings of the International Joint Conference on Neural Networks (Washington, D.C.)*, vol. 1, pp. 676–679. IEEE, New York, 1990.

[267] Minnix, J.I. Fault tolerance of the backpropagation neural network trained on noisy inputs. In *Proceedings* of the International Joint Conference on Neural Networks (Baltimore), vol. 1, pp. 847–852. IEEE, New York, 1992.

[268] Minsky, M., and S. Papert. Perceptrons, Expanded Edition. MIT Press, Cambridge, 1988.

[269] Mitchison, G.J., and R.M. Durbin. Bounds on the learning capacity of some multi-layer networks. *Biological Cybernetics* 60:345–356, 1989.

[270] Moller, M.F. A scaled conjugate gradient algorithm for fast supervised learning. *Neural Networks* 6(4):525–533, 1993.

[271] Moody, J., and C. Darken. Learning with localized receptive fields. In *Proceedings of the 1988 Connectionist Models Summer School*, pp. 133–143. Morgan Kaufmann, San Mateo, 1988.

[272] Moody, J., and C. Darken. Fast learning in networks of locally-tuned processing units. *Neural Computation* 1:281–294, 1989.

[273] Moody, J.E. The effective number of parameters: An analysis of generalization and regularization in nonlinear learning systems. In J.E. Moody, S.J. Hanson, and R.P. Lippmann, editors, *Advances in Neural Information Processing Systems* (4), pp. 847–854. Morgan Kaufmann, San Mateo, 1992. [274] Moore, B. Theory of networks for learning. In *SPIE* Vol. 1294, *Applications of Artificial Neural Networks*, pp. 22–30. Society of Photo-Optical Instrumentation Engineers, Bellingham, WA, 1990.

[275] Mozer, M.C., and P. Smolensky. Skeletonization: A technique for trimming the fat from a network via relevance assessment. In D.S. Touretzky, editor, *Advances in Neural Information Processing Systems (Denver, 1988)* (1), pp. 107–115. Morgan Kaufmann, San Mateo, 1989.

[276] Mukhopadhyay, S., A. Roy, L.S. Kim, and S. Govil. A polynomial time algorithm for generating neural networks for pattern classification: Its stability properties and some test results. *Neural Computation* 5(2):317–330, 1993.

[277] Müller, B., and J. Reinhardt. Neural Networks, An Introduction. Springer-Verlag, Berlin, 1990.

[278] Muroga, S. Threshold logic and its Applications. Wiley, New York, 1971.

[279] Murphy, O.J. Nearest neighbor pattern classification perceptrons. *Proceedings of the IEEE* 78(10):1595–1598, 1990.

[280] Murphy, O.J. An information theoretic design and training algorithm for neural networks. *IEEE Transaction on Circuits and Systems* 38(12):1542–1547, 1991.

[281] Musavi, M.T., K.H. Chan, D.M. Hummels, and K. Kalantri. On the generalization ability of neural network classifiers. *IEEE Transactions on Pattern Analysis and Machine Intelligence* 16(6):659–663, 1994.

[282] Natarajan, B.K. Machine Learning, A Theoretical Approach. Morgan Kaufmann, San Mateo, 1991.

[283] Nguyen, D.H., and B. Widrow. Improving the learning speed of 2-layer neural networks by choosing initial values of the adaptive weights. In *Proceedings of the International Joint Conference on Neural Networks (San Diego)*, vol. 3, pp. 211–226. IEEE, New York, 1990.

[284] Nilsson, N.J. *The Mathematical Foundations of Learning Machines*. Morgan-Kaufmann, San Mateo, 1990 (reprint).

[285] Nowlan, S.J., and G.E. Hinton. Adaptive soft weight tying using Gaussian mixtures. In J.E. Moody, S.J. Hanson, and R.P. Lippmann, editors, *Advances in Neural Information Processing Systems* (4), pp. 993–1000. Morgan Kaufmann, San Mateo, 1992.

[286] Nowlan, S.J., and G.E. Hinton. Simplifying neural networks by soft weight-sharing. *Neural Computation* 4(4):473–493, 1992.

[287] Oh, S., R.J. Marks, II, and M.A. El-Sharkawi. Query based learning in a multilayered perceptron in the presence of data jitter. In M.A. El-Sharkawi and R.J. Marks, II, editors, *Applications of Neural Networks to Power Systems (Seattle)* pp. 72–75. IEEE Press, New York, 1991.

[288] Oja, E. Neural networks, principal components, and subspaces. *International Journal of Neural Systems* 1(1):61–68, 1089.

[289] Oja, E. A simplified neuron model as a principal component analyzer. *Journal of Mathematical Biology* 15:267–273, 1982.

[290] Oja, E., and J. Karhunen. On stochastic approximation of the eigenvectors and eigenvalues of the expectation of a random matrix. *Journal of Mathematical Analysis and Applications* 106:69–84, 1985.

[291] Okada, H., et al. Initializing multilayer neural networks with fuzzy logic. In *Proceedings of the International Joint Conference on Neural Networks (Baltimore)*, vol. 1, pp. 239–244. IEEE, New York, 1992.

[292] Oppenheim, A.V., A.S. Willsky, and I.T. Young. *Signals and Systems*. Prentice-Hall, Englewood Cliffs, NJ, 1983.

[293] Pados, D.A., and P. Papantoni-Kazakos. A note on the estimation of the generalization error and the prevention of overfitting. In *IEEE International Conference on Neural Networks (Orlando)*, vol. 1, pp. 321–325. IEEE, New York, 1994.

[294] Palubinskas, G. Data-driven weight initialization of back-propagation for pattern recognition. In *Proceedings of the International Conferance on Artificial Neural Networks (ICANN'94)*, pp. 851–854. Springer-Verlag, London, 1994.

[295] Parker, D.B. Learning logic. *Technical Report* TR-47. Center for Computational Research in Economics and Management Science, Massachusetts Institute of Technology, Cambridge, 1985.

[296] Parker, D.B. Optimal algorithms for adaptive networks: Second-order back propagation, second-order direct propagation, and second-order Hebbian learning. In *Proceedings of the IEEE First International Conference on Neural Networks (San Diego)*, vol. 2, pp. 593–600. IEEE, New York, 1987.

[297] Pearlmutter, B.A. Fast exact multiplication by the Hessian. Neural Computation 6(1):147–160, 1994.

[298] Pearlmutter, B.A., and R. Rosenfeld. Chaitin-Kolmogorov complexity and generalization in neural networks. In R. Lippmann, J. Moody, and D. Touretzky, editors, *Advances in Neural Information Processing Systems* (3), pp. 925–931. Morgan Kaufmann, San Mateo, 1991.

[299] Plaut, D.C., S.J. Nowlan, and G.E. Hinton. Experiments on learning by back propagation. *Technical Report* CMU-CS-86-126, Carnegie-Mellon University, Pittsburgh, 1986.

[300] Poggio, T., and F. Girosi. Networks for approximation and learning. *Proceedings of the IEEE* 78(9):1481–1497, Sept. 1990.

[301] Poston, T., C.-N. Lee, Y. Choie, and Y. Kwon. Local minima and back propagtion. In *Proceedings of the International Joint Conference on Neural Networks (Seattle)*, vol. 2, pp. 173–176. IEEE, New York, 1991.

[302] Press, W.H., B.P. Flannery, S.A. Teukolsky, and W.T. Vetterling. *Numerical Recipes in C*. Cambridge University Press, Cambridge, 1988.

[303] Raudys, S., and M. Skurikhina. The role of the number of training samples on weight initialization of artificial neural net classifier. In *RNNS/IEEE Symposium on Neuroinformatics and Neurocomputing (Rostov-on-Don, Russia)*, pp. 343–353. IEEE Press, New York, 1992.

[304] Rechenberg, I. Artificial evolution and artificial intelligence. In R. Forsyth, editor, *Machine Learning, Principles and Techniques*, pp. 83–103. Chapman and Hall Computing, New York, 1989.

[305] Reed, R., R.J. Marks, II, and S. Oh. An equivalence between sigmoidal gain scaling and training with noisy (jittered) input data. In *RNNS/IEEE Symposium on Neuroinformatics and Neurocomputing (Rostov-on-Don, Russia)*, pp. 120–127. IEEE Press, New York, 1992.

[306] Reed, R., R.J. Marks, II, and S. Oh. Similarities of error regularization, sigmoid gain scaling, target smoothing, and training with jitter. *IEEE Transactions on Neural Networks* 6(3):529–538, May 1995.

[307] Reed, R., S. Oh, and R.J. Marks, II. Regularization using jittered training data. In *Proceedings of the International Joint Conference on Neural Networks (Baltimore)*, vol. 3, pp. 147–152. IEEE, New York, 1992.

[308] Reed, R.D. Pruning algorithms—a survey. IEEE Transactions on Neural Networks, 4(5):740–744, 1993.

[309] Reed, R.D., J.E. Sanders, and R.J. Marks, II. Neural network aided prosthetic alignment. In 1995 IEEE International Conference on Systems, Man, and Cybernetics, Vancouver, British Columbia, Oct. 1995, vol. 1, pp. 505–508, IEEE, New York, 1995.

[310] Refregier, Ph. and J.-M. Vignolle. An improved version of the pseudo-inverse solution for classification and neural networks. *Europhysics Letters* 10(4):387–392, 1989.

[311] Reklaitis, G.V., A. Ravindran, and K.M. Ragsdell. *Engineering Optimization, Methods and Applications*. Wiley, 1983.

[312] Rezgui, A., and Nazif Tepedelenlioglu. The effect of the slope of the activation function on the back propagation algorithm. In *Proceedings of the International Joint Conference on Neural Networks (Washington D.C.)*, vol. 1, pp. 707–710. IEEE, New York, 1990.

[313] Ricotti, L.P., S. Ragazzini, and G. Martinelli. Learning of word stress in a sub-optimal second order backpropagation neural network. In *Proceedings of the IEEE International Conference on Neural Networks (San Diego)*, vol. 1, pp. 355–361. IEEE, New York, 1988.

[314] Riedmiller, M. Advanced supervised learning in multi-layer perceptrons—from backpropagation to adaptive learning algorithms. *Computer Standards & Interfaces* 16, 1994.

[315] Riedmiller, M., and H. Braun. A direct adaptive method for faster backpropagation learning: The RPROP algorithm. In *IEEE International Conference on Neural Networks (San Francisco)*, vol. 1, pp. 586–591. IEEE, New York, 1993.

[316] Rigler, A.K., J.M. Irvine, and T.P. Vogl. Rescaling of variables in back propagation learning. *Neural Networks* 4(2):225–229, 1991.

[317] Ripley, B.D. Pattern Recognition and Neural Networks. Cambridge University Press, Cambridge, 1996.

[318] Robbins, H., and S. Monro. A stochastic optimization method. *Annals of Mathematical Statistics*, 22:400–407, 1951.

[319] Rogers, D. Predicting weather using a genetic memory: a combination of Kanerva's sparse distributed memory with Holland's genetic algorithms. In D.S. Touretzky, editor, *Advances in Neural Information Processing Systems* (2), pp. 455–464. Morgan Kaufmann, San Mateo, 1989.

[320] Rohwer, R. Time trials on second-order and variable-learning-rate algorithms. In *Advances in Neural Information Processing Systems* (3), pp. 977–983. Morgan Kaufmann, San Mateo, 1991.

[321] Rojas, R. Optimal weight initialization for neural networks. In *Proceedings of the International Conference on Artificial Neural Networks (ICANN'94)*, pp. 577–580. Springer-Verlag, London, 1994.

[322] Romaniuk, S.G., and L.O. Hall. Dynamic neural networks with the use of divide and conquer. In *Proceedings of the International Joint Conference on Neural Networks (Baltimore)*, vol. 1, pp. 658–663. IEEE, New York, 1992.

[323] Röscheisen, M., R. Hofmann, and V. Tresp. Neural control for rolling mills: Incorporating domain theories to overcome data deficiency. In J.E. Moody, S.J. Hanson, and R.P. Lippmann, editors, *Advances in Neural Information Processing Systems* (4), pp. 659–666. Morgan Kaufmann, San Mateo, 1992.

[324] Rosenblatt, F. The perceptron: a probabilistic model for information storage and organization in the brain. *Psychological Review* 65:386–408, 1958 (reprinted in J.A. Anderson and E. Rosenfeld, editors, *Neurocomputing*. MIT Press, Cambridge, 1988).

[325] Rosenblatt, F., editor. Principles of Neurodynamics. Spartan Books, Washington, D.C., 1962.

[326] Roy, S., and J.J. Shynk. Analysis of the momentum LMS algorithm. *IEEE Transactions on Acoustics, Speech, and Signal Processing* 38:2088–2098, 1990.

[327] Ruderman, D.L., and W. Bialek. Seeing beyond the Nyquist limit. Neural Computation 4(5):682–690, 1992.

[328] Rumelhart, D.E., R. Durbin, R. Golden, and Y. Chauvin. Backpropagation: The basic theory. In Y. Chauvin and D.E. Rumelhart, editors, *Backpropagation: Theory, Architectures, and Applications*, chapter 1. Erlbaum, Hillsdale, NJ, 1994.

[329] Rumelhart, D.E., G.E. Hinton, and R.J. Williams. Learning internal representations by back-propagating errors. *Nature* 323:533–536, 1986 (reprinted in J.A. Anderson and E. Rosenfeld, editors, *Neurocomputing*. MIT Press, Cambridge, 1988).

[330] Rumelhart, D.E., G.E. Hinton, and R.J. Williams. Learning internal representations by error propagation. In D.E. Rumelhart and J.L. McClelland, editors, *Parallel Distributed Processing*, Vol. I, chapter 8. MIT Press, Cambridge, 1986 (reprinted in J.A. Anderson and E. Rosenfeld, editors, *Neurocomputing*. MIT Press, Cambridge, 1988).

[331] Saarinen, S., R. Bramley, and G. Cybenko. Ill-conditioning in neural network training problems. *SIAM Journal of Scientific Computing* 14(3):693–714, 1993.

[332] Samad, T. Backpropagation improvements based on heuristic arguments. In *Proceedings of the International Joint Conference on Neural Networks (Washington D.C.)*, vol. 1, pp. 565–568. IEEE, New York, 1990.

[333] Sanger, T.D. Optimal unsupervised learning in a single-layer linear feedforward neural network. *Neural Networks* 2(6):459–473, 1989.

[334] Sanger, T.D. An optimality principle for unsupervised learning. In D.S. Touretzky, editor, *Advances in Neural Information Processing Systems* (1), pp. 11–19. Morgan Kaufmann, San Mateo, 1989.

[335] Sankar, A., and R.J. Mammone. Optimal pruning of neural tree networks for improved generalization. In *Proceedings of the International Joint Conference on Neural Networks (Seattle)*, vol. 2, pp. 219–224. IEEE, New York, 1991.

[336] Schreibman, D.V., and E.M. Norris. Speeding up back propagation by gradient correlation. In *Proceedings* of the International Joint Conference on Neural Networks (Washington, D.C.), vol. 1, pp. 723–726. IEEE, New York, 1990.

[337] Schwartz, D.B., V.K. Samalan, S.A. Solla, and J.S. Denker. Exhaustive learning. *Neural Computation* 2(3):374–385, 1990.

[338] Segee, B.E., and M.J. Carter. Fault tolerance of pruned multilayer networks. In *Proceedings of the International Joint Conference on Neural Networks (Seattle)*, vol. 2, pp. 447–452. IEEE, New York, 1991.

[339] Séquin, C.H., and R.D. Clay. Fault tolerance in feed-forward artificial neural networks. In Paolo Antognetti and Veljko Milutinović, editors, *Neural Networks: Concepts, Applications, and Implementations*, vol. 4, pp. 111–141. Prentice–Hall, Englewood Cliffs, NJ, 1991.

[340] Sethi, I.K. Entropy nets: From decision trees to neural networks. *Proceedings of the IEEE* 78(10):1605–1613, Oct. 1990.

[341] Shanno, D.F. Recent advances in numerical techniques for large scale optimization. In W.T. Miller, III, R.S. Sutton, and P.J. Werbos, editors, *Neural Networks for Control*, pp. 171–178. MIT Press, Cambridge, 1990.

[342] Shavlik, J.W. A framework for combining symbolic and neural learning. In V. Honavar and L. Uhr, editors, *Artificial Intelligence and Neural Networks: Steps Toward Principled Integration*, pp. 561–580. Academic Press, New York, 1994.

[343] Shynk, J.J., and S. Roy. The LMS algorithm with momentum updating. In *Proceedings of the IEEE International Symposium on Circuits and Systems*, pp. 2651–2654. IEEE, New York, 1988.

[344] Sietsma, J., and R.J.F. Dow. Neural net pruning—why and how. In *Proceedings of the IEEE International Conference on Neural Networks (San Diego)*, vol. 1, pp. 325–333. IEEE, New York, 1988.

[345] Sietsma, J., and R.J.F. Dow. Creating artificial neural networks that generalize. *Neural Networks* 4(1):67–79, 1991.

[346] Silva, F.M., and L.B. Almeida. Acceleration techniques for the backpropagation algorithm. In L.B. Almeida and C.J. Wellekens, editors, *Neural Networks, Proceedings EURASIP Workshop*, vol. 412 of *Lecture Notes in Computer Science*, pp. 110–119. Springer-Verlag, New York, 1990.

[347] Siu, K.-Y., V. Roychowdhury, and T. Kailath. *Discrete Neural Computation, A Theoretical Foundation*. Prentice-Hall, Englewood Cliffs, NJ, 1995.

[348] Siu, K.-Y., V.P. Roychowdhury, and T. Kailath. Depth-size tradeoffs for neural computation. *IEEE Transactions on Computers* 40(12):1402–1412, 1991.

[349] Smyth, S.G. Designing multi layer perceptrons from nearest neighbor systems. *IEEE Transactions on Neural Networks* 3(2):329–333, 1992.

[350] Sontag, E.D. Feedback stabilization using two-hidden-layer nets. *Technical Report* SYCON-90-11, Rutgers Center for Systems and Control, Princeton, NJ, 1990.

[351] Sontag, E.D. Feedback stabilization using two-hidden-layer nets. *IEEE Transactions on Neural Networks* 3(6):981–990, 1992.

[352] Sontag, E.D., and H.J. Sussmann. Backpropagation can give rise to spurious local minima even for networks without hidden layers. *Complex Systems* 3:91–106, 1989.

[353] Sontag, E.D., and H.J. Sussmann. Backpropagation separates when perceptrons do. In *Proceedings of the International Joint Conference on Neural Networks (Washington, D.C.)*, vol. 1, pp. 639–642. IEEE Press, New York, 1989.

[354] Sperduti, A., and A. Starita. Speed up learning and network optimization with extended back propagation. *Neural Networks* 6(3):365–383, 1993.

[355] Sprecher, D.A. On the structure of continuous functions of several variables. *Transactions of the American Mathematical Society* 115(3):340–355, 1965.

[356] Sprecher, D.A. A universal mapping for Kolmogorov's superposition theorem. *Neural Networks* 6(8):1089–1094, 1993.