5767

References

- Agarwal, Arvind, and III, Hal Daumé. 2010. A Geometric View of Conjugate Priors.

 Machine Learning, 81(1), 99–113. pages 200
- Agresti, A. 2002. Categorical Data Analysis. Wiley. pages 241
- Akaike, Hirotugu. 1974. A New Look at the Statistical Model Identification. *IEEE Transactions on Automatic Control*, **19**(6), 716–723. pages 247
- Akhiezer, N.I., and Glazman, I.M. 1993. *Theory of Linear Operators in Hilbert Space*.

 Dover Publications, Inc. pages 341
- Alpaydin, Ethem. 2010. Introduction to Machine Learning. The MIT Press. pages 13
- Amari, Shun-ichi. 2016. Information Geometry and Its Applications. Springer. pages 183
- Argyriou, Andreas, and Dinuzzo, Francesco. 2014. A Unifying View of Representer
 Theorems. Pages 748–756 of: Xing, Eric P., and Jebara, Tony (eds), *Proceedings*of the 31st International Conference on Machine Learning. Proceedings of Machine
 Learning Research, vol. 32, no. 2. Bejing, China: PMLR. pages 331
- Aronszajn, N. 1950. Theory of Reproducing Kernels. *Transactions of the American*Mathematical Society, **68**, 337–404. pages 338, 341
- Bakir, Gökhan, Hofmann, Thomas, Schölkopf, Bernhard, Smola, Alexander J., Taskar, Ben, and Vishwanathan, S.V.N (eds). 2007. *Predicting Structured Data*. MIT Press. pages 238
- Barber, David. 2012. *Bayesian Reasoning and Machine Learning*. Cambridge University Press. pages 14, 205, 274, 316
- Ben-Hur, Asa, Ong, Cheng Soon, Sonnenburg, Sören, Schölkopf, Bernhard, and Rätsch, Gunnar. 2008. Support Vector Machines and Kernels for Computational Biology. PLoS Computational Biology, 4(10), e1000173. pages 338, 341
- Bennett, Kristin P., and Bredensteiner, Erin J. 2000. Duality and Geometry in SVM Classifiers. In: *Proceedings of the Seventeenth International Conference on Machine* Learning. pages 336
- Bertsekas, Dimitri P. 1999. Nonlinear Programming. Athena Scientific. pages 224
 - Bertsekas, Dimitri P. 2009. Convex Optimization Theory. Athena Scientific. pages 224
- Bickel, Peter J., and Doksum, Kjell. 2006. *Mathematical Statistics, Basic Ideas and Selected Topics, Vol I.* Prentice Hall. pages 204
- Bickson, Danny, Dolev, Danny, Shental, Ori, Siegel, Paul H., and Wolf, Jack K. 2007. Linear Detection via Belief Propagation. In: *Proceedings of the Annual Allerton Conference on Communication, Control, and Computing*. pages 233
- Billingsley, Patrick. 1995. Probability and Measure. Wiley. pages 171, 204
- Bishop, Christopher M. 1995. Neural Networks for Pattern Recognition. Clarendon
 Press. pages 274
- Bishop, Christopher M. 1999. Bayesian PCA. Pages 382–388 of: Advances in Neural
 Information Processing Systems. pages 296

343

Draft chapter (June 25, 2018) from "Mathematics for Machine Learning" ©2018 by Marc Peter Deisenroth, A Aldo Faisal, and Cheng Soon Ong. To be published by Cambridge University Press. Report errata and feedback to http://mml-book.com. Please do not post or distribute this file, please link to http://mml-book.com.

Bishop, Christopher M. 2006. *Pattern Recognition and Machine Learning*. Information Science and Statistics. Springer-Verlag. pages 13, 87, 163, 168, 180, 200, 201, 204, 205, 233, 238, 259, 274, 287, 315, 316, 341

- Blei, David M., Kucukelbir, Alp, and McAuliffe, Jon D. 2017. Variational Inference: A Review for Statisticians. *Journal of the American Statistical Association*, **112**(518), 859–877. pages 204
- Bonnans, J. Frédéric, Gilbert, J. Charles, Lemaréchal, Claude, and Sagastizábal, Claudia A. 2006. Numerical Optimization: Theoretical and Practical Aspects. 2nd edn.
 Springer Verlag. pages 224
- Borwein, Jonathan M., and Lewis, Adrian S. 2006. *Convex Analysis and Nonlinear Optimization*. 2nd edn. Canadian Mathematical Society. pages 224
- Bottou, Leon. 1998. Online Algorithms and Stochastic Approximations. Pages 1–34
 of: Online Learning and Neural Networks. Cambridge University Press. pages 212
- Bottou, Léon, Curtis, Frank E., and Nocedal, Jorge. 2018. *Optimization Methods for*Large-Scale Machine Learning. pages 212, 224
- Boucheron, Stephane, Lugosi, Gabor, and Massart, Pascal. 2013. Concentration Inequalities: A Nonasymptotic Theory of Independence. pages 168
- Boyd, Stephen, and Vandenberghe, Lieven. 2004. *Convex Optimization*. Cambridge University Press. pages 210, 213, 214, 224
- Brooks, Steve, Gelman, Andrew, Jones, Galin L., and Meng, Xiao-Li (eds). 2011. Hand book of Markov Chain Monte Carlo. Chapman and Hall/CRC. pages 204
- Brown, Lawrence D. 1986. Fundamentals of Statistical Exponential Families: with Applications in Statistical Decision Theory. Lecture Notes Monograph Series. Institute of Mathematical Statistics. pages 202
- Bryson, Arthur E. 1961. A Gradient Method for Optimizing Multi-stage Allocation
 Processes. In: Proceedings of the Harvard University Symposium on Digital Computers
 and Their Applications. pages 152, 154
- Bubeck, Sébastien. 2015. Convex Optimization: Algorithms and Complexity. Founda tions and Trends in Machine Learning, 8(3-4), 231–357. pages 224
- Casella, George, and Berger, Roger L. 2002. *Statistical Inference*. Duxbury. pages 177, 184, 186, 241
- Chang, Chih-Chung, and Lin, Chih-Jen. 2011. LIBSVM: A library for support vector machines. ACM Transactions on Intelligent Systems and Technology, 2, 27:1–27:27.
 Software available at http://www.csie.ntu.edu.tw/~cjlin/libsvm. pages 341
- Chollet, Francois, and Allaire, J. J. 2018. Deep Learning with R. Manning Publications.
 pages 14
- Codd, Edgar F. 1990. The Relational Model for Database Management. Addison-Wesley
 Longman Publishing. pages 10
- Cunningham, John P., and Ghahramani, Zoubin. 2015. Linear Dimensionality Reduction: Survey, Insights, and Generalizations. *Journal of Machine Learning Research*,
 16, 2859–2900. pages 296
- Dean, Jeffrey, Corrado, Greg S, Monga, Rajat, Chen, Kai, Devin, Matthieu, Le, Quoc V,
 Mao, Mark Z, Ranzato, Marc Aurelio, Senior, Andrew, Tucker, Paul, Yang, Ke, and
 Ng, Andrew Y. 2012. Large Scale Distributed Deep Networks. Pages 1–11 of: Advances in Neural Information Processing Systems. pages 212
- Deisenroth, Marc P., and Mohamed, Shakir. 2012. Expectation Propagation in Gaussian Process Dynamical Systems. Pages 2618–2626 of: *Advances in Neural Information Processing Systems*. pages 233
- Deisenroth, Marc P., and Ohlsson, Henrik. 2011. A General Perspective on Gaussian Filtering and Smoothing: Explaining Current and Deriving New Algorithms. In: Proceedings of the American Control Conference. pages 192

Deisenroth, Marc P., Fox, Dieter, and Rasmussen, Carl E. 2015. Gaussian Processes for Data-Efficient Learning in Robotics and Control. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, **37**(2), 408–423. pages vi, 84

- Dempster, A. P., Laird, N. M., and Rubin, D. B. 1977. Maximum Likelihood from Incomplete Data via the EM Algorithm. *Journal of the Royal Statistical Society*, **39**(1), 1–38. pages 310
- Deng, Li, Seltzer, Michael L, Yu, Dong, Acero, Alex, Mohamed, Abdel-rahman, and Hinton, Geoffrey E. 2010. Binary Coding of Speech Spectrograms using a Deep Auto-Encoder. Pages 1692–1695 of: *Interspeech*. pages 75
- Devroye, Luc. 1986. Non-Uniform Random Variate Generation. Springer-Verlag. pages
 196
- Domingos, Pedro. 2012. A few useful things to know about machine learning. *Communications of the ACM*, **55**, 78–87. pages 13
- Dostál, Zdeněk. 2009. Optimal Quadratic Programming Algorithms: With Applications to Variational Inequalities. Springer-Verlag, pages 332
- Downey, Allen B. 2014. *Think Stats: Exploratory Data Analysis*. 2nd edn. O'Reilly Media. pages 204
- Dreyfus, Stuart. 1962. The Numerical Solution of Variational Problems. *Journal of Mathematical Analysis and Applications*, **5**(1), 30–45. pages 152, 154
- Drumm, Volker, and Weil, Wolfgang. 2001. *Lineare Algebra und Analytische Geometrie*.

 Lecture Notes, Universität Karlsruhe. pages 16
- Dudley, R. M. 2002. Real Analysis and Probability. Cambridge University Press. pages
 204
- Efron, Bradley, and Hastie, Trevor. 2016. *Computer Age Statistical Inference: Algorithms, Evidence and Data Science*. Cambridge University Press. pages 196
- Evgeniou, Theodoros, Pontil, Massimiliano, and Poggio, Tomaso. 2000. Statistical Learning Theory: A Primer. *International Journal of Computer Vision*, **38**(1), 9–13. pages 241
- Gal, Yarin, van der Wilk, Mark, and Rasmussen, Carl E. 2014. Distributed Variational
 Inference in Sparse Gaussian Process Regression and Latent Variable Models. In:
 Advances in Neural Information Processing Systems. pages 212
- Gärtner, Thomas. 2008. Kernels for Structured Data. World Scientific. pages 338
- Ghahramani, Zoubin. 2015. Probabilistic Machine Learning and Artificial Intelligence.
 Nature, 521, 452–459. pages 174, 204
- Ghahramani, Zoubin, and Roweis, Sam T. 1999. Learning Nonlinear Dynamical Systems using an EM Algorithm. In: Kearns, M. S., Solla, S. A., and Cohn, D. A. (eds),

 Advances in Neural Information Processing Systems, vol. 11. The MIT Press. pages
 316
- Gneiting, Tilmann, and Raftery, Adrian E. 2007. Strictly proper scoring rules, prediction, and estimation. *Journal of the American Statistical Association*, **102**(477), 359–378. pages 341
- Goh, Gabriel. 2017. Why Momentum Really Works. Distill. pages 210
- Gonçalves, Hugo. 2014. Legendre and Legendre-Fenchel transforms. Accessed on 3
 March 2018. pages 224
- Goodfellow, Ian, Bengio, Yoshua, and Courville, Aaron. 2016. *Deep Learning*. MIT Press. http://www.deeplearningbook.org. pages 204, 238, 274
- Grinstead, Charles M., and Snell, J. Laurie. 1997. *Introduction to Probability*. American Mathematical Society. pages 166, 190, 204
- Hacking, Ian. 2001. Probability and Inductive Logic. Cambridge University Press. pages
 204
- Hasselblatt, Boris, and Katok, Anatole. 2003. *A first course in dynamics with a Panorama of Recent Developments*. Cambridge University Press. pages 166

Hazan, Elad. 2015. Introduction to Online Convex Optimization. Foundations and
 Trends, 2(3-4), 157–325. pages 224

- Hensman, James, Fusi, Nicolò, and Lawrence, Neil D. 2013. Gaussian Processes for Big Data. In: Nicholson, A., and Smyth, P. (eds), *Proceedings of the Conference on Uncertainty in Artificial Intelligence*. AUAI Press. pages 212
- Herbrich, Ralf, Minka, Tom, and Graepel, Thore. 2007. TrueSkill(TM): A Bayesian
 Skill Rating System. Pages 569–576 of: Advances in Neural Information Processing
 Systems. MIT Press. pages 233
- Hiriart-Urruty, Jean-Baptiste, and Lemaréchal, Claude. 2001. Fundamentals of Convex
 Analysis. Springer Verlag. pages 224, 332
- Hoffman, Matthew D., Blei, David M., Wang, Chong, and Paisley, John. 2013. Stochas tic Variational Inference. *Journal of Machine Learning Research*, 14(1), 1303–1347.
 pages 212
- Hofmann, Thomas, Schölkopf, Bernhard, and Smola, Alexander J. 2008. Kernel methods in machine learning. *Ann. Statist.*, **36**(3), 1171–1220. pages 331
- Hogben, L. (ed). 2013. *Handbook of Linear Algebra*. 2nd edn. Discrete Mathematics and Its Applications. Chapman and Hall. pages 16
- Hotelling, Harold. 1933. Analysis of a Complex of Statistical Variables into Principal Components. *Journal of Educational Psychology*, **24**, 417–441. pages 75, 87, 276
- Imbens, Guido W., and Rubin, Donald B. 2015. Causal Inference for statistics, social
 and biomedical sciences. Cambridge University Press. pages 238
- Jacod, Jean, and Protter, Philip. 2004. *Probability Essentials*. 2nd edn. Springer-Verlag.
 pages 165, 204
- Jaynes, Edwin T. 2003. Probability Theory: The Logic of Science. Cambridge University
 Press. pages 166, 167, 174, 204
- Jefferys, Willian H., and Berger, James O. 1992. Ockham's Razor and Bayesian Analysis.
 Sis. American Scientist, 80, 64–72. pages 245

5908

5900

5910

- Joachims, Thorsten. 1999. Making large-Scale SVM Learning Practical. In: Schölkopf, B., Burges, C., and Smola, A. (eds), *Advances in Kernel Methods Support Vector Learning*. MIT Press. pages 341
- Julier, Simon J., and Uhlmann, Jeffrey K. 1997. A New Extension of the Kalman Filter
 to Nonlinear Systems. Pages 182–193 of: Proceedings of AeroSense: 11th Symposium
 on Aerospace/Defense Sensing, Simulation and Controls. pages 163
- Kalman, Dan. 1996. A singularly valuable decomposition: the SVD of a matrix. *The college mathematics journal*, **27**(1), 2–23. pages 115, 123
- Kalman, Rudolf E. 1960. A New Approach to Linear Filtering and Prediction Problems.
 Transactions of the ASME—Journal of Basic Engineering, 82(Series D), 35–45. pages
 192
- Kelley, Henry J. 1960. Gradient Theory of Optimal Flight Paths. Ars Journal, 30(10),
 947–954. pages 152, 154
- Kimeldorf, George S., and Wahba, Grace. 1970. A correspondence between Bayesian estimation on stochastic processes and smoothing by splines. *The Annals of Mathematical Statistics*, **41**(2), 495–502. pages 331
- Kingma, Diederik P, and Welling, Max. 2013. Auto-encoding variational bayes. *arXiv* preprint arXiv:1312.6114. pages 108
- Kittler, J., and Föglein, J. 1984. Contextual Classification of Multispectral Pixel Data.
 IMage and Vision Computing, 2(1), 13–29. pages 233
- Koller, Daphne, and Friedman, Nir. 2009. *Probabilistic Graphical Models*. MIT Press. pages 233, 238
- Lawrence, Neil. 2005. Probabilistic Non-linear Principal Component Analysis with Gaussian Process Latent Variable Models. *Journal of Machine Learning Research*, 6(Nov.), 1783–1816. pages 296

Leemis, Lawrence M., and McQueston, Jacquelyn T. 2008. Univariate Distribution Relationships. *The American Statistician*, **62**(1), 45–53. pages 196, 199

- Lehmann, Erich L., and Romano, Joseph P. 2005. *Testing Statistical Hypotheses*. Springer. pages 187
- Lehmann, Erich Leo, and Casella, George. 1998. Theory of Point Estimation. Springer.
 pages 202, 204
- Liesen, Jörg, and Mehrmann, Volker. 2015. *Linear Algebra*. Springer Undergraduate Mathematics Series. Springer. pages 16, 106
- Luenberger, David G. 1969. *Optimization by Vector Space Methods*. John Wiley and Sons. pages 224
- MacKay, Davic J. C. 2003. *Information Theory, Inference, and Learning Algorithms*. The Edinburgh Building, Cambridge CB2 2RU, UK: Cambridge University Press. pages 245, 316
- MacKay, David J. C. 1992. Bayesian Interpolation. *Neural Computation*, **4**, 415–447. pages 245
- MacKay, David J. C. 1998. Introduction to Gaussian Processes. Pages 133–165 of:
 Bishop, C. M. (ed), Neural Networks and Machine Learning, vol. 168. Berlin, Germany: Springer. pages 275
- Mackay, David J.C. 2003. *Information Theory, Inference and Learning Algorithms*. Cambridge University Press. pages 13, 204, 205
- Manton, Jonathan H., and Amblard, Pierre-Olivier. 2015. A Primer on Reproducing Kernel Hilbert Spaces. Foundations and Trends in Signal Processing, **8**(12), 1–126. pages 341
- Maybeck, Peter S. 1979. *Stochastic Models, Estimation, and Control*. Mathematics in Science and Engineering, vol. 141. Academic Press, Inc. pages 163

5958

5959

5960

5967

5968

- McEliece, Robert J., MacKay, David J. C., and Cheng, Jung-Fu. 1998. Turbo Decoding as an Instance of Pearl's "Belief Propagation" Algorithm. *IEEE Journal on Selected Areas in Communications*, **16**(2), 140–152. pages 233
- Mnih, Volodymyr, Kavukcuoglu, Koray, Silver, David, Rusu, Andrei A., Veness, Joel,
 Bellemare, Marc G., Graves, Alex, Riedmiller, Martin, Fidjeland, Andreas K., Ostrovski, Georg, Petersen, Stig, Beattie, Charles, Sadik, Amir, Antonoglou, Ioannis, King, Helen, Kumaran, Dharshan, Wierstra, Daan, Legg, Shane, and Hassabis,
 Demis. 2015. Human-Level Control through Deep Reinforcement Learning. *Nature*,
 518(Feb.), 529–533. pages 212
 - Müller, Andreas C., and Guido, Sarah. 2016. *Introduction to Machine Learning with Python: A Guide for Data Scientists*. O'Reilly Publishing. pages 14
- Murphy, Kevin P. 2012. *Machine Learning: A Proabilistic Perspective*. Cambridge, MA, USA: MIT Press. pages 13, 192, 199, 204, 205, 244, 247, 274, 316, 341
- Neal, Radford M. 1996. *Bayesian Learning for Neural Networks*. Ph.D. thesis, Department of Computer Science, University of Toronto. pages 275
- Neal, Radford M., and Hinton, Geoffrey E. 1999. A View of the EM Algorithm that Justifies Incremental, Sparse, and Other Variants. Pages 355–368 of: Jordan, M. I. (ed), Learning in Graphical Models. MIT Press. pages 310
- Nelsen, Roger. 2006. An Introduction to Copulas. Springer Verlag. pages 187
- Nocedal, Jorge, and Wright, Stephen J. 2006. *Numerical Optimization*. Springer Series in Operations Research. Springer. pages 157, 224, 341
- Nowozin, Sebastian, Gehler, Peter V., Jancsary, Jeremy, and Lampert, Christoph H. (eds). 2014. *Advanced Structured Prediction*. MIT Press. pages 238
- O'Hagan, Anthony. 1991. Bayes-Hermite Quadrature. *Journal of Statistical Planning* and Inference, **29**, 245–260. pages 247
- Parzen, Emanuel. 1962. On Estimation of a Probability Density Function and Mode.

 The Annals of Mathematical Statistics, 33(3), 1065–1076. pages 317

Pearl, Judea. 1988. Probabilistic Reasoning in Intelligent Systems: Networks of Plausible
 Inference. Morgan Kaufmann. pages 167, 237

- Pearl, Judea. 2009. Causality: Models, Reasoning and Inference. 2nd edn. Cambridge University Press. pages 238
- Pearson, Karl. 1895. Contributions to the Mathematical Theory of Evolution. II. Skew Variation in Homogeneous Material. *Philosophical Transactions of the Royal Society* A: Mathematical, Physical and Engineering Sciences, **186**, 343–414. pages 317
- Pearson, Karl. 1901. On Lines and Planes of Closest Fit to Systems of Points in Space.
 Philosophical Magazine, 2(11), 559–572. pages 276
- Peters, Jonas, Janzing, Dominik, and Schölkopf, Bernhard. 2017. *Elements of Causal Inference: Foundations and Learning Algorithms*. The MIT Press. pages 238
- Petersen, K. B., and Pedersen, M. S. 2012 (nov). *The Matrix Cookbook*. Version 20121115. pages 151
- Pollard, David. 2002. A User's Guide to Measure Theoretic Probability. Cambridge
 University Press. pages 204
- Polyak, Roman A. 2016. The Legendre Transformation in Modern Optimization. Pages
 437–507 of: Optimization and Its Applications in Control and Data Sciences. Springer
 Optimization and Its Applications. pages 224
- Raschka, Sebastian, and Mirjalili, Vahid. 2017. *Python Machine Learning: Machine Learning and Deep Learning with Python, scikit-learn, and TensorFlow*. Packt Publishing. pages 14
- Rasmussen, Carl E., and Ghahramani, Zoubin. 2003. Bayesian Monte Carlo. Pages 489–496 of: Becker, S., Thrun, S., and Obermayer, K. (eds), *Advances in Neural Information Processing Systems 15*. Cambridge, MA, USA: The MIT Press. pages 247
- Rasmussen, Carl E., and Williams, Christopher K. I. 2006. *Gaussian Processes for Machine Learning*. Adaptive Computation and Machine Learning. Cambridge, MA, USA: The MIT Press. pages 87, 192, 205, 274, 275, 334
- Rasmussen, Carl Edward, and Ghahramani, Zoubin. 2001. Occam's Razor. Pages 294—300 of: *Advances in Neural Information Processing Systems 13*. The MIT Press. pages 247
- Reid, Mark, and Williamson, Robert C. 2011. Information, Divergence and Risk for Binary Experiments. *Journal of Machine Learning Research*, **12**, 731–817. pages 341
- Rezende, Danilo Jimenez, and Mohamed, Shakir. 2015. Variational Inference with
 Normalizing Flows. In: *ICML*. pages 204
- Rifkin, Ryan M., and Lippert, Ross A. 2007. Value Regularization and Fenchel Duality.

 Journal of Machine Learning Research, 8, 441–479. pages 332, 334
- Rockafellar, R. Tyrrell. 1970. *Convex Analysis*. Princeton University Press. pages 224
- Rogers, Simon, and Girolami, Mark. 2016. A First Course in Machine Learning. Second edn. Chapman and Hall/CRC. pages 13, 315
- Rosenbaum, Paul R. 2017. Observation & Experiment: An introduction to causal inference. Harvard University Press. pages 238
- Rosenblatt, Murray. 1956. Remarks on Some Nonparametric Estimates of a Density Function. *The Annals of Mathematical Statistics*, **27**(3), 832–837. pages 317
- Roweis, Sam, and Ghahramani, Zoubin. 1999. A Unifying Review of Linear Gaussian Models. Neural Computation, 11(2), 305–345. pages 192, 316
- Roweis, Sam T. 1998. EM algorithms for PCA and SPCA. Pages 626–632 of: *Advances in Neural Information Processing Systems*. pages 295
- Rumelhart, David E., Hinton, Geoffrey E., and Williams, Ronald J. 1986. Learning Representations by Back-propagating Errors. *Nature*, **323**(6088), 533–536. pages 152, 154, 210
- Saitoh, Saburou. 1988. *Theory of Reproducing Kernels and its Applications*. Longman Scientific & Technical. pages 338, 341

Schölkopf, Bernhard, and Smola, Alexander J. 2002. Learning with Kernels—Support
Vector Machines, Regularization, Optimization, and Beyond. Adaptive Computation
and Machine Learning. Cambridge, MA, USA: The MIT Press. pages 87, 275, 296,
323, 337, 341

- Schölkopf, Bernhard, Smola, Alexander J., and Müller, Klaus-Robert. 1998. Nonlinear
 Component Analysis as a Kernel Eigenvalue Problem. Neural Computation, 10(5),
 1299–1319. pages 87
- Schwartz, Laurent. 1964. Sous espaces Hilbertiens d'espaces vectoriels topologiques et noyaux associés. *Journal d'Analyse Mathématique*, **13**, 115–256. in French. pages 341
- Schwarz, Gideon E. 1978. Estimating the Dimension of a Model. *Annals of Statistics*, 6048 **6**(2), 461–464. pages 248
- Shalev-Shwartz, Shai, and Ben-David, Shai. 2014. *Understanding Machine Leanring:*From Theory to Algorithms. Cambridge University Press. pages 14, 168, 324
- Shawe-Taylor, John, and Cristianini, Nello. 2004. *Kernel Methods for Pattern Analysis*.

 Cambridge University Press. pages 337, 341
- Shawe-Taylor, John, and Sun, Shiliang. 2011. A review of optimization methodologies in support vector machines. *Neurocomputing*, **74**(17), 3609–3618. pages 341
 - Shental, O., Bickson, D., P. H. Siegel and, J. K. Wolf, and Dolev, D. 2008. Gaussian Belief Propagatio Solver for Systems of Linear Equations. In: *IEEE International Symposium on Information Theory*. pages 233
- Shewchuk, Jonathan Richard. 1994 (August). *An Introduction to the Conjugate Gradient Method Without the Agonizing Pain*. Carnegie Mellon University, Edition 1 1/4. pages 224
- Shi, Qinfeng, Petterson, James, Dror, Gideon, Langford, John, Smola, Alex, and Vishwanathan, S.V.N. 2009. Hash Kernels for Structured Data. *Journal of Machine Learning Research*, 2615–2637. pages 338
- Shiryayev, A. N. 1984. Probability. Springer-Verlag. pages 204

6065

6073

6074

- Shor, Naum Z. 1985. *Minimization Methods for Non-differentiable Functions*. Springer. pages 224
- Shotton, Jamie, Winn, John, Rother, Carsten, and Criminisi, Antonio. 2006. Texton-Boost: Joint Appearance, Shape and Context Modeling for Mulit-Class Object Recognition and Segmentation. In: *Proceedings of the European Conference on Computer* Vision. pages 233
- Spiegelhalter, David, and Smith, A. F. M. 1980. Bayes Factors and Choice Criteria for Linear Models. *Journal of the Royal Statistical Society B*, **42**(2), 213–220. pages 245
 - Steinwart, Ingo, and Christmann, Andreas. 2008. Support Vector Machines. Springer-Verlag. pages 332
- Stoer, Josef, and Burlirsch, Roland. 2002. *Introduction to Numerical Analysis*. Springer. pages 87, 247
- Strang, Gilbert. 1993. The fundamental theorem of linear algebra. *The American Mathematical Monthly*, **100**(9), 848–855. pages 115, 123
- Strang, Gilbert. 2003. *Introduction to Linear Algebra*. 3rd edn. Wellesley-Cambridge Press. pages 16, 83
- Strang, Gilbert, Strang, Gilbert, Strang, Gilbert, and Strang, Gilbert. 1993. *Introduction to linear algebra*. Vol. 3. Wellesley-Cambridge Press Wellesley, MA. pages 123
- Sucar, Luis E., and Gillies, Duncan F. 1994. Probabilistic Reasoning in High-Level Vision. *Image and Vision Computing*, **12**(1), 42–60. pages 233
- Szeliski, Richard, Zabih, Ramin, Scharstein, Daniel, Veksler, Olga, Kolmogorov, Vladimir, Agarwala, Aseem, Tappen, Marshall, and Rother, Carsten. 2008. A Comparative Study of Energy Minimization Methods for Markov Random Fields with Smoothness-based Priors. *IEEE Transactions on Pattern Analysis and Machine Intelli-*
- gence, **30**(6), 1068–1080. pages 233

Tibshirani, Robert. 1996. Regression Selection and Shrinkage via the Lasso. *Journal* of the Royal Statistical Society B, **58**(1), 267–288. pages 259, 275

- Tipping, Michael E., and Bishop, Christopher M. 1999. Probabilistic Principal Component Analysis. *Journal of the Royal Statistical Society: Series B*, **61**(3), 611–622. pages 192, 295
- Titsias, Michalis K., and Lawrence, Neil D. 2010. Bayesian Gaussian Process Latent
 Variable Model. Pages 844–851 of: Teh, Y. W., and Titterington, D. M. (eds), Proceedings of the International Conference on Artificial Intelligence and Statistics. JMLR
 W&CP, vol. 9. pages 296
- Toussaint, Marc. 2012. Some Notes on Gradient Descent. pages 209
- Vapnik, Vladimir. 2000. The Nature of Statistical Learning Theory. Springer Verlag.
 pages 323
- 6102 Vapnik, Vladimir N. 1998. Statistical Learning Theory. Wiley. pages 241
- Vapnik, Vladimir N. 1999. An Overview of Statistical Learning Theory. *IEEE Transactions on Neural Networks*, **10**(5), 988–999. pages 241
- Vishwanathan, S.V.N., Schraudolph, Nicol N., Kondor, Risi, and Borgwardt, Karsten M.
 2010. Graph Kernels. 11, 1201–1242. pages 338
- von Luxburg, Ulrike, and Schölkopf, Bernhard. 2011. Statistical Learning Theory: Models, Concepts, and Results. Vol. 10. Amsterdam, Netherlands: Elsevier North Holland.
 Pages 651–706. pages 241
- Wahba, Grace. 1990. Spline Models for Observational Data. Society for Industrial and
 Applied Mathematics. pages 341
- 6112 Wasserman, Larry. 2004. All of Statistics. Springer. pages 185
- 6113 Wasserman, Larry. 2007. All of Nonparametric Statistics. Springer Verlag. pages 201
- Wickham, Hadley. 2014. Tidy Data. Journal of Statistical Software, 59. pages 10
- Williams, Christopher K. I. 1997. Computing with Infinite Networks. In: Neural Information Processing Systems. pages 275
- Zia, Royce K. P., Redish, Edward F., and McKay, Susan R. 2009. Making sense of the
 Legendre transform. American Journal of Physics, 77(614). pages 224