

参考文献

- [1] P. Abry and D. Veitch, Wavelet analysis of long-range-dependent traffic. *IEEE Transactions on Information Theory*, Vol. 44, No. 1, pp. 2–15, January 1998.
- [2] Y. J. Aminetzah. *An exact approach to the polling system*. PhD thesis, Department of Electrical Engineering, McGill University, Montreal, Quebec, Canada, 1975.
- [3] J. Beran, Statistical methods for data with long-range dependence. *Statistical Science*, Vol. 7, No. 4, pp. 404–427, 1992.
- [4] J. Beran, *Statistics for Long-Memory Processes*. Monographs on Statistics and Applied Probability. Chapman and Hall, New York, 1994.
- [5] J. Beran, R. Sherman, M. S. Taqqu, and W. Willinger, Long-range dependence in variable-bit-rate video traffic. *IEEE Transactions on Communications*, Vol. 43, No. 2/3/4, pp. 1566–1579, March–April 1995.
- [6] J. Beran and N. Terrin, Estimation of the long-memory parameter, based on a multivariate central limit theorem. *Journal of Time Series Analysis*, Vol. 15, No. 3, pp. 269–278, 1995.
- [7] R. N. Bhattacharya, V. Gupta, and E. Waymire, The Hurst effect under trends. *Journal of Applied Probability*, Vol. 20, No. 649–662, 1983.
- [8] C. Bingham, M. D. Godfrey, and J. W. Tukey, Modern techniques in power spectrum estimation. *IEEE Transactions on Audio and Electroacoustics*, Vol. AU-15, No. 2, pp. 56–66, 1967.
- [9] D. Boulliant, Estimating the long-range dependence using wavelet analysis. Technical report, Department of Telecommunications and Mathematics, University of Karlskrona/Ronneby, December 1997.
- [10] G. E. P. Box, G. M. Jenkins, and G. C. Reinsel, *Time Series Analysis: Forecasting and Control*. Prentice-Hall, New Jersey, 3rd edition, 1994.

- [11] O. J. Boxma, Workloads and waiting times in single-server systems with multiple customer classes. *Queueing Systems*, Vol. 5, No. 1-3, pp. 185-214, November 1989.
- [12] E. O. Brigham, 高速フーリエ変換. 科学技術出版社, 1979.
- [13] P. J. Burke, Equilibrium delay distribution for one channel with constant holding time, Poisson input and random service. *The Bell System Technical Journal*, Vol. 38, pp. 1021-1031, July 1959.
- [14] G. M. Carter and R. B. Cooper, Queues with service in random order. *Operations Research*, Vol. 20, No. 2, pp. 389-405, March-April 1972.
- [15] K. Chandra and A. R. Reibman, Modeling one- and two-layer variable bit rate video. *IEEE/ACM Transactions on Networking*, Vol. 7, No. 3, pp. 398-413, June 1999.
- [16] G. L. Choudhury and H. Takagi, Exact results for nonsymmetric token ring systems. *IEEE Transactions on Communications*, Vol. 38, No. 8, pp. 1125-1127, August 1990.
- [17] E. G. Coffman, Jr. and E. N. Gilbert, A continuous polling system with constant service times. *IEEE Transactions on Information Theory*, Vol. 5, No. 1-3, pp. 185-214, November 1986.
- [18] J. W. Cohen, *The Single Server Queue*. North-Holland Publishing Company, Amsterdam, revised edition edition, 1982.
- [19] B. Conolly, *Lecture Notes on Queueing Systems*. Ellis Horwood Limited, Sussex, England, 1975.
- [20] R. B. Cooper, *Introduction to Queueing Theory*. North-Holland, New York, second edition edition, 1981.
- [21] D. R. Cox, Long-range dependence: A review. In H. A. David and H. T. David, editors, *Statistics: An Appraisal Proceedings 50 th Anniversary Conference*, pp. 55-74. The Iowa State University Press, 1984.
- [22] N. G. Duffield, Queueing at large resources driven by long-tailed M/G/ ∞ -modulated processes. *Queueing Systems*, Vol. 28, No. 1-3, pp. 245-266, May 1998.
- [23] W. Feller, The asymptotic distribution of the range of sums of independent random variables. *Annals of Mathematical Statistics*, Vol. 22, pp. 427-432, 1951.

- [24] M. J. Ferguson and Y. J. Aminetzah, Exact results for nonsymmetric token ring systems. *IEEE Transactions on Communications*, Vol. COM-33, No. 3, pp. 223–231, March 1985.
- [25] M. J. Ferguson, Computation of the variance of the waiting time for token rings. *IEEE Journal on Selected Areas in Communications*, Vol. SAC-4, No. 6, pp. 775–782, 1986.
- [26] S. W. Fuhrmann, Second moments relationships for waiting times in queueing systems with Poisson input. *Queueing Systems*, Vol. 8, No. 4, pp. 397–406, June 1962.
- [27] 藤原洋 (編), 最新 MPEG 教科書. アスキー出版, 1994.
- [28] 藤原洋 (編), 実戦 MPEG 教科書. アスキー出版, 1995.
- [29] 藤原洋 (編), DVD とビデオ CD. アスキー出版, 1996.
- [30] 藤原洋 (編), インターネット時代の画像圧縮技術. アスキー出版, 1996.
- [31] M. W. Garrett and W. Willinger, Analysis, modeling and generation of self-similar VBR video traffic. *Proceedings of the ACM/SIGCOMM '94*, pp. 269–281, 1994.
- [32] B. W. Gnedenko and D. Köning, editors, *Handbuch der Bedienungstheorie II. Formeln und andere Ergebnisse*. Akademie-Verlag, Berlin, 1984.
- [33] O. Hashida, Analysis of multiqueue. *Review of the Electrical Communication Laboratories*, Vol. 20, No. 3–4, pp. 189–199, March–April 1972.
- [34] D. P. Heyman, Ali Tabatabai, and T. V. Lakshman, Statistical analysis and simulation study of video teleconference traffic in ATM networks. *IEEE Transactions on Circuits and Systems for Video Technology*, Vol. 2, No. 1, pp. 49–59, March 1992.
- [35] D. P. Heyman and T. V. Lakshman, Source models for VBR broadcast-video traffic. *IEEE/ACM Transactions on Networking*, Vol. 4, No. 1, pp. 40–48, February 1996.
- [36] D. P. Heyman and T. V. Lakshman, What are the implications of long-range dependence for VBR-video traffic engineering? *IEEE/ACM Transactions on Networking*, Vol. 4, No. 3, pp. 301–317, June 1996.
- [37] 日野幹雄, スペクトル解析. 朝倉書店, 1977.

- [38] J. R. M. Hosking, Fractional differencing. *Biometrika*, Vol. 68, No. 1, pp. 165–176, 1981.
- [39] C. Huang, M. Devetsikiotis, I. Lambadaris, and A. R. Kaye, Modeling and simulation of self-similar variable bit rate compressed video: A unified approach. In *Proceedings of the ACM/SIGCOMM '95*, pp. 114–125. Cambridge, 1995.
- [40] H. E. Hurst, Long-term storage capacity of reservoirs. *American Society of Civil Engineers Transactions*, Vol. 116, pp. 770–808, 1951.
- [41] C. Ji, S. Ma, and X. Tian, Approximation capability of independent wavelet model to heterogeneous network traffic. In *IEEE INFOCOM '99 The Conference on Computer Communications*, pp. 170–177. IEEE Computer Society and IEEE Communications Society, 1999.
- [42] J. F. C. Kingman, On queues in which customers are served in random order. *Proceedings of the Cambridge Philosophical Society*, Vol. 58, Part 1, pp. 79–91, 1962.
- [43] L. Kleinrock, *Queueing Systems, Volume 2: Computer Applications*. John Wiley and Sons, New York, 1976.
- [44] K. Kobayashi and Y. Takahashi, On the tail distribution of a fluid queue with stationary Gaussian input rate process. 情報通信ネットワークの新しい性能評価法に関する総合研究, シンポジウム報文集, pp. 64–75, 1997.
- [45] A. G. Konheim, H. Levy, and M. M. Srinivasan, Descendant set: An efficient approach for the analysis of polling systems. *IEEE Transactions on Communications*, Vol. 1994, No. 2/3/4, pp. 1245–1253, February/March/April 1994.
- [46] K. R. Krishnan and G. Meempat, Long-range dependence in VBR video streams and ATM traffic engineering. *Performance Evaluation*, Vol. 30, No. 1–2, pp. 45–55, July 1997.
- [47] M. M. Krunz and A. M. Makowski, Modeling video traffic using M/G/ ∞ input processes: A compromise between Markov and LRD models. *IEEE Journal on Selected Areas in Communications*, Vol. 16, No. 5, pp. 733–748, June 1998.
- [48] 工藤誠也, ATM ネットワークにおけるセルのトラヒックの自己相似性に関する研究. 修士論文, 筑波大学大学院博士課程社会工学研究科, 1997年3月.
- [49] 工藤誠也, 高木英明, 濱田元, 久保田文人, ATM 網における圧縮動画像トラヒックの自己相似性. 電子情報通信学会論文誌 B-I, Vol. J81-B-I, No. 9, pp. 549–556, 1998.

- [50] 工藤誠也, 小林和朝, 高木英明, 濱田元, 久保田文人, スペクトル解析による MPEG2 ビデオトラヒックの自己相似性. 電子情報通信学会論文誌 B 掲載予定, Vol. J83-B, No. 1, 2000.
- [51] 工藤誠也, 高木英明, 非定常 M/G/ ∞ システムによる自己相似過程の生成. 情報通信ネットワークの新しい性能評価に関する総合評価, pp. 160–169, 1999.
- [52] S. Kudoh, H. Takagi, and O. Hashida, Second moments of the waiting time in symmetric polling systems. *Journal of the Operations Research Society of Japan* に採録, 1999.
- [53] T. Kurasugi, K. Kobayashi, and Y. Takahashi, Data analysis and modeling of ATM coded video traffic with scene changes. 情報通信ネットワークに関する性能評価モデルの総合研究, シンポジウム報文集, 1996.
- [54] T. Kurasugi, Data analysis and modeling of ATM coded video traffic with scene changes. Master's thesis, Tokyo Institute of Technology, Department of Information Sciences, February 1996.
- [55] W. E. Leland, M. S. Taqqu, W. Willinger, and D. V. Wilson, On the self-similar nature of Ethernet traffic (extended version). *IEEE/ACM Transactions on Networking*, Vol. 2, No. 1, pp. 1–15, February 1994.
- [56] W. E. Leland, W. Willinger, M. S. Taqqu, and D. V. Wilson, Statistical analysis and stochastic modeling of self-similar datatraffic. In *ITC 14*, pp. 319–328, 1994.
- [57] B. B. Mandelbrot and J. W. van Ness, Fractional Brownian motions, fractional noises and applications. *SIAM Review*, Vol. 10, No. 4, pp. 422–437, October 1968.
- [58] B. B. Mandelbrot and J. R. Wallis, Computer experiments with fractional Gaussian noises. *Water Resources Research*, Vol. 5, No. 1, pp. 242–267, February 1969.
- [59] P. Manzoni, P. Cremonesi, and G. Serazzi, Workload models of VBR video traffic and their use in resource allocation policies. *IEEE/ACM Transactions on Networking*, Vol. 7, No. 3, pp. 387–397, June 1999.
- [60] R. D. van der Mei, Polling systems in heavy traffic: higher moments of the delay. In V. Ramaswami and P. E. Wirth, editors, *Teletraffic Analysis for the Communication Age (Proceedings of the 15 th International Teletraffic Vongress - ITC 15)*, pp. 275–284. Elsevier, 1997.
- [61] 三木彌一, MPEG-4 のすべて. 工業調査会, 1998.

- [62] I. Norros, A storage model with self-similar input. *Queueing Systems*, Vol. 16, No. 3-4, pp. 387-396, May 1994.
- [63] I. Norros, On the use of fractional Brownian motion in the theory of connectionless networks. *IEEE Journal on Selected Areas in Communications*, Vol. 13, No. 6, pp. 953-962, August 1995.
- [64] 小倉久直, 確率過程論. コロナ社, 1978.
- [65] 尾崎統, 線形システムとフーリエ解析. 尾崎統, 北川源四郎 (編), 時系列解析の方法, 統計科学選書 5, 第 4 章, pp. 28-52. 朝倉書店, 1998.
- [66] M. Parulekar and A. M. Makowski, Tail probabilities for M/G/ ∞ input processes (I): Preliminary asymptotics. *Queueing Systems*, Vol. 27, No. 3-4, pp. 271-296, April 1997.
- [67] V. Paxson, Empirically derived analytic models of wide-area TCP connections. *IEEE/ACM Transactions on Networking*, Vol. 2, No. 4, pp. 316-336, August 1994.
- [68] V. Paxson and S. Floyd, Wide area traffic: The failure of Poisson modeling. *IEEE/ACM Transactions on Networking*, Vol. 3, No. 3, pp. 226-244, June 1995.
- [69] M. B. Priestley, *Spectral analysis of time series*. Academic Press, London, 1981.
- [70] S. Robert and J-Yves Le Boudec, New models for pseudo self-similar traffic. *Performance Evaluation*, Vol. 30, No. 1-2, pp. 57-68, July 1997.
- [71] P. M. Robinson, Semiparametric analysis of long-memory time series. *The Annals of Statistics*, Vol. 22, No. 15, pp. 515-539, 1994.
- [72] G. Samorodnitsky and M. S. Taqqu, *Stable Non-Gaussian Random Processes: Stochastic Models with Infinite Variance*. Chapman and Hall, New York, 1994.
- [73] D. Sarkar and W. I. Zangwill, Waiting time variance for nonsymmetric cyclic queueing systems. Technical report, AT & T Bell Laboratories, June 1991.
- [74] Y. G. Sinai, Self-similar probability distributions. *Theory of Probability and its Applications*, Vol. 21, No. 1, pp. 64-80, 1976.
- [75] M. M. Srinivasan, H. Levy, and A. G. Konheim, The individual station technique for the analysis of cyclic polling systems. *Naval Research Logistics*, Vol. 43, No. 1, pp. 79-101, February 1996.
- [76] 杉原左右一, 時系列の統計研究. 東京経済, 1987.

- [77] L. Takács, Delay distributions for one line with Poisson input, general holding times, and various orders of service. *The Bell System Technical Journal*, Vol. 42, No. 2, pp. 487-503, 1963.
- [78] L. Takács, Two queues attended by a single server. *Operations Research*, Vol. 16, No. 3, pp. 639-650, May-June 1968.
- [79] H. Takagi, *Analysis of Polling Systems*. The MIT Press, Cambridge, Massachusetts, 1986.
- [80] H. Takagi, Queuing analysis of polling models. *ACM Computing Surveys*, Vol. 20, No. 1, pp. 5-28, March 1988.
- [81] H. Takagi, *Queuing Analysis, A Foundation of Performance Evaluation, Volume 1: Vacation and Priority Systems*. Elsevier Science Publishers B. V. (North-Holland), Amsterdam, 1991.
- [82] H. Takagi and K. Sakamaki, Symbolic moment calculation for an M/G/1 queue. Discussion paper No. 596, Institute of Socio-Economic Planning, University of Tsukuba, 1994.
- [83] H. Takagi and S. Kudoh, Symbolic higher-order moments of the waiting time in an M/G/1 queue with random order service. Discussion paper No. 646, Institute of Socio-Economic Planning, University of Tsukuba, 1995.
- [84] H. Takagi and K. Sakamaki, Moments for an M/G/1 queue. *The Mathematica Journal*, Vol. 6, Issue 1, pp. 75-80, Winter 1996.
- [85] H. Takagi and S. Kudoh, Symbolic higher-order moments of the waiting time in an M/G/1 queue with random order of service. *Communications in Statistics: Stochastic Models*, Vol. 13, No. 1, pp. 167-179, 1997.
- [86] 高木英明, 情報通信トラヒックの自己相似性 - ここにもフラクタル -. *SUT Bulletin*, Vol. 16, No. 2, pp. 22-29, February 1999.
- [87] 高安秀樹, フラクタル. 朝倉書店, 1986.
- [88] M. S. Taqqu, A bibliographical guide to self-similar processes and long-range dependence. In E. Eberlein and M. S. Taqqu, editors, *Dependence in Probability and Statistics*, pp. 137-165. Birkhauser, Boston, 1986.
- [89] M. S. Taqqu, Proof of a fundamental result in self-similar traffic modeling. *ACM SIGCOMM Computer Communication Review*, pp. 5-23, 1997.

- [90] M. S. Taqqu, V. Teverovsky, and W. Willinger, Estimation for long-range dependence: An empirical study. *Fractals*, Vol. 3, No. 4, pp. 785–798, 1995.
- [91] M. S. Taqqu and W. Willinger, Is network traffic self-similar or multifractal? *Fractals*, Vol. 5, No. 1, pp. 63–73, 1997.
- [92] テレビジョン学会 (編), MPEG. オーム社, 1996.
- [93] B. Tsybakov and N. D. Georganas, On self-similar traffic in ATM queues: Definitions, overflow, probability, bound, and cell delay distribution. *IEEE/ACM Transactions on Networking*, Vol. 5, No. 3, pp. 397–409, June 1997.
- [94] 梅山伸二, 半坂剛, 入門 xDSL. 技術評論社, 1999.
- [95] W. Vervaat, Sample path properties of self-similar processes with stationary increments. *Annals of Probability*, Vol. 13, No. 1, pp. 191–208, 1985.
- [96] W. Vervaat, Properties of general self-similar processes. *Bulletin of the International Statistical Institute*, Vol. 52, No. 4, pp. 119–216, 1987.
- [97] P. Whittle, Estimation and information in stationary time series. *Arkiv för Matematik*, Vol. 2, pp. 423–434, 1953.
- [98] W. Willinger, M. S. Taqqu, W. E. Leland, and D. Willson, Self-similarity in high speed packet traffic: Analysis and modeling of Ethernet traffic measurements. *Statistical Science*, Vol. 10, No. 1, pp. 67–85, 1995.
- [99] W. Willinger, M. S. Taqqu, and A. Erramilli, A bibliographical guide to self-similar traffic and performance modeling for modern high-speed networks. In F. P. Kelly, S. Zachary, and I. Ziedins, editors, *Stochastic Networks: Theory and Applications*, pp. 339–366. Oxford University Press, Oxford, U. K., 1996.
- [100] W. Willinger, M. S. Taqqu, R. Sharman, and D. V. Wilson, Self-similarity through high-variability: Statistical analysis of Ethernet LAN traffic at the source level. *IEEE/ACM Transactions on Networking*, Vol. 5, No. 1, pp. 71–86, February 1997.
- [101] 矢島美寛, Long-memory モデルとその統計的性質. 日本統計学会誌, Vol. 19, No. 2, pp. 219–236, 1989.