

PUBLICATIONS

JOURNAL PAPERS

Submitted

1. M. Madiman and I. Kontoyiannis. “Entropy bounds on abelian groups and the Ruzsa divergence.” To appear, *IEEE Transactions on Information Theory*.
2. I. Kontoyiannis and S.P. Meyn. “Approximating a diffusion by a hidden Markov model.” To appear, *Stochastic Processes and their Applications*.

Published or in press

3. I. Kontoyiannis and S.P. Meyn. “On the f -norm ergodicity of Markov processes in continuous time.” *Electronic Communications in Probability*, **21**, paper 77, pp. 1–10, November 2016.
4. I. Kontoyiannis and M. Skoularidou. “Estimating the directed information and testing for causality.” *IEEE Transactions on Information Theory*, **62**, no. 11, pp. 6053–6067, November 2016.
5. I. Kontoyiannis and M. Madiman. “Sunset and inverse sunset inequalities for differential entropy and mutual information.” *IEEE Transactions on Information Theory*, **60**, no. 8, pp. 4503–4514, August 2014.
6. I. Kontoyiannis and S. Verdú. “Optimal lossless data compression: Non-asymptotics and asymptotics.” *IEEE Transactions on Information Theory*, **60**, no. 2, pp. 777–795, February 2014.
7. O. Johnson, I. Kontoyiannis and M. Madiman. “Log-concavity, ultra-log-concavity and a maximum entropy property of discrete compound Poisson measures.” *Discrete Applied Mathematics*, (Special issue, Proceedings of the Jubilee Conference on Discrete Mathematics JCDM 2009, D.J. Kleitman, A. Shastri, V.T. So’s, eds.) **161**, no. 9, pp. 1232–1250, June 2013.
8. C. Gioran and I. Kontoyiannis. “Complexity-compression tradeoffs in lossy compression via efficient random codebooks and databases.” *Problems of Information Transmission*, **48**, Issue 4, pp. 376–394, October 2012.
9. I. Kontoyiannis and S.P. Meyn. “Geometric ergodicity and the spectral gap of non-reversible Markov chains.” *Probability Theory and Related Fields*, **154**, Issue 1–2, pp. 327–339, October 2012.
10. V. Anantharam, G. Caire, M. Costa, I. Kontoyiannis, G. Kramer, R. Yeung, and S. Verdú. “Panel on *New Perspectives on Information Theory*.” (Invited discussion.) *IEEE Information Theory Society Newsletter*, pp. 21–27, March 2012.
11. P. Dellaportas and I. Kontoyiannis. “Control variates for estimation based on reversible Markov chain Monte Carlo samplers.” *Journal of the Royal Statistical Society: Series B*, **74**, Issue 1, pp. 133–161, January 2012.
12. P. Harremoës, O. Johnson and I. Kontoyiannis. “Thinning, entropy and the law of thin numbers.” *IEEE Transactions on Information Theory*, **56**, no. 9, pp. 4228–4244, September 2010.
13. A.D. Barbour, O. Johnson, I. Kontoyiannis and M. Madiman. “Compound Poisson approximation via information functionals.” *Electronic Journal of Probability*, **15**, paper 42, pp. 1344–1369, August 2010.
14. I. Kontoyiannis. “Book review: “*Information and complexity in statistical modeling*,” by J. Rissanen, Springer, NY, 2007.” *Amer. Math. Monthly*, **115**, no. 10, pp. 956–960, December 2008.
15. I. Kontoyiannis and S.P. Meyn. “Computable exponential bounds for screened estimation and simulation.” *Annals of Applied Probability*, **18**, no. 4, pp. 1491–1518, August 2008.

16. M. Harrison and I. Kontoyiannis. “Estimation of the rate-distortion function.” *IEEE Transactions on Information Theory*, **54**, no. 8, pp. 3757–3763, August 2008.
17. Y. Gao, I. Kontoyiannis and E. Bienenstock. “Estimating the entropy of binary time series: Methodology, some theory and a simulation study.” *Entropy*, **10**, issue 2, pp. 71–99, June 2008.
18. I. Kontoyiannis. “Counting the primes using entropy.” *IEEE Information Theory Newsletter*, **58**, no. 2, pp. 6–9, June 2008.
19. H.M. Aktulga, I. Kontoyiannis, L.A. Lyznik, L. Szpankowski, A.Y. Grama and W. Szpankowski. “Identifying statistical dependence in genomic sequences via mutual information estimates.” In *EURASIP Journal on Bioinformatics and Systems Biology*, **vol. 2007**, article ID 14741, November 2007.
20. I. Kontoyiannis and M. Madiman. “Measure concentration for compound Poisson distributions.” *Electronic Communications in Probability*, **11**, paper 5, pp. 45–57, May 2006.
21. I. Kontoyiannis and R. Zamir. “Mismatched codebooks and the role of entropy-coding in lossy data compression.” *IEEE Transactions on Information Theory*, **52**, pp. 1922–1938, May 2006.
22. A. Anagnostopoulos, I. Kontoyiannis, and E. Upfal. “Steady state analysis of balanced-allocation routing,” *Random Structures & Algorithms*, **26**, pp. 446–467, July 2005.
23. I. Kontoyiannis and S.P. Meyn. “Large deviations asymptotics and the spectral theory of multiplicatively regular Markov processes,” *Electronic Journal of Probability*, **10**, paper 3, pp. 61–123, February 2005.
24. I. Kontoyiannis, P. Harremoës and O. Johnson. “Entropy and the law of small numbers,” *IEEE Transactions on Information Theory*. **51**, pp. 466–472, February 2005.
25. I. Kontoyiannis. “Pattern matching and lossy data compression on random fields,” *IEEE Transactions on Information Theory*. **49**, pp. 1047–1051, April 2003.
26. N. Merhav and I. Kontoyiannis. “Source coding exponents for zero-delay coding with finite memory,” *IEEE Transactions on Information Theory*, **49**, pp. 609–625, March 2003.
27. I. Kontoyiannis and S.P. Meyn. “Spectral theory and limit theorems for geometrically ergodic Markov processes,” *Annals of Applied Probability*. **13**, pp. 304–362, February 2003.
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32. I. Kontoyiannis. “Sphere-covering, measure concentration, and source coding,” *IEEE Transactions on Information Theory*, **46**, pp. 1544–1552, May 2001.
33. A. Dembo and I. Kontoyiannis. “Critical behavior in lossy source coding,” *IEEE Transactions on Information Theory*, **46**, pp. 1230–1236, March 2001.

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35. I. Kontoyiannis. "An implementable lossy version of the Lempel-Ziv algorithm – Part I: Optimality for memoryless sources," *IEEE Transactions on Information Theory*, **45**, pp. 2293–2305, November 1999.
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42. I. Kontoyiannis and Yu.M. Suhov. "Prefixes and the entropy rate for long-range sources," Chapter 6 in *Probability Statistics and Optimization: A Tribute to Peter Whittle*, (F.P. Kelly, editor), pp. 89–98, Wiley, Chichester, 1994.

PATENTS

43. V. Castelli, I. Kontoyiannis, J. Robinson and J.J. Turek. U.S. Patent No. 6,021,224. "Multiresolution lossless/lossy compression and storage of data for efficient processing thereof." Oct 2000.
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- U1. A. Anagnostopoulos, C. Dombry, N. Guillotin-Plantard, I. Kontoyiannis and E. Upfal. "Probabilistic analysis of the k -server problem on the circle." *arXiv online manuscript*, May 2010.
- U2. P. Dellaportas and I. Kontoyiannis "Notes on using control variates for estimation with reversible MCMC samplers," *arXiv online manuscript*, July 2009.
- U3. V. Castelli and I. Kontoyiannis. "An efficient recursive partitioning algorithm for classification, using wavelets," *APPTS Technical Report #02-7*, Brown University, September 2002.
- U4. I. Kontoyiannis. "The complexity and entropy of literary styles." *NSF Technical Report no. 97*, Department of Statistics, Stanford University, June 1996.
- U5. I. Kontoyiannis, J. Turek, V. Castelli and J. Robinson. "Multiresolution lossless image compression." Unpublished manuscript, December 1995.

BOOK

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- Vol2. *Third Workshop on Information Theoretic Methods in Science and Engineering*. Proceedings. Edited by J. Heikkonen, I. Kontoyiannis, E.P. Liski, P. Myllymaki, J. Rissanen and I. Tabus. Tampere University Press, August 2010. ISBN 978-952-15-2000-6.
- Vol3. *IEEE 2009 Information Theory Workshop on Networking and Information Theory*. Proceedings. Edited by V. Anantharam and I. Kontoyiannis. IEEE Press, June 2009. ISBN: 978-1-4244-4536-3.
- Vol4. *Second Workshop on Information Theoretic Methods in Science and Engineering*. Proceedings. Edited by J. Heikkonen, I. Kontoyiannis, E.P. Liski, P. Myllymaki, J. Rissanen and I. Tabus. Tampere University Press, August 2009. ISBN 978-952-15-2207-9.
- Vol5. *First Workshop on Information Theoretic Methods in Science and Engineering*. Proceedings. Edited by K. Yamanishi, I. Kontoyiannis, E.P. Liski, P. Myllymaki, J. Rissanen and I. Tabus. Tampere University Press, August 2008. ISBN 978-952-15-2420-2.

CONFERENCES (papers/talks)

- C1. “Bayesian suffix trees and context tree weighting.” **Plenary talk**, *International Zurich Seminar on Communications*, Zurich, Switzerland, February 2018.
- C2. “Simulated convergence rates with application to an intractable α -stable inference problem,” with M. Riabiz, T. Ardeshiri and S. Godsill. **Invited paper**, *2017 IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing*, Curaçao, Dutch Antilles, December 2017.
- C3. “Exact speed and transmission cost in a simple one-dimensional wireless delay-tolerant network,” with D. Cheliotis, M. Loulakis and S. Toumpis. *2017 IEEE International Symposium on Information Theory*, Aachen, Germany, June 2017.
- C4. “Context trees and model selection for discrete time series.” **Invited talk**, *2016 IEEE Information Theory Workshop*, Cambridge, UK, September 2016.
- C5. “Model selection algorithms for discrete time series.” **Keynote lecture**, *11th Athens Colloquium on Algorithms & Complexity*, Athens, Greece, August 2016.
- C6. “Testing temporal causality and estimating directed information.” **Invited talk**, *Nexus of Information and Computation Theories*, Institut Henri Poincaré, Paris, France, March 2016.
- C7. “Entropy bounds on abelian groups and the Ruzsa divergence,” with M. Madiman. **Invited talk**, *2016 Information Theory and Applications Workshop*, University of California, San Diego, February 2016.
- C8. “Finding structure in data: Bayesian inference for discrete time series.” **Invited talk**, *Stochastic Methods in Finance and Physics Workshop*, Heraklion, Greece, July 2015.
- C9. “Small trees & long memory: Bayesian inference for discrete time series.” **Plenary talk**, *16th Conference of the ASMDA Intern’al Society*, Piraeus, Greece, July 2015.
- C10. “The Ruzsa divergence on groups,” with M. Madiman. **Invited paper**, *2015 Workshop on Information Theoretic Methods in Science and Engineering*, Copenhagen, Denmark, June 2015.

- C11. “Causality and directed information estimation as a hypothesis test,” with M. Skoularidou. **Invited paper**, *2015 Workshop on Information Theoretic Methods in Science and Engineering*, Copenhagen, Denmark, June 2015.
- C12. “The entropy of sums and Rusza’s divergence on abelian groups,” with M. Madiman. **Invited paper**, *2013 IEEE Information Theory Workshop*, Sevilla, Spain, September 2013.
- C13. “Optimal lossless compression: Source varentropy and dispersion,” with S. Verdú. *2013 IEEE International Symposium on Information Theory*, Istanbul, Turkey, July 2013.
- C14. “Lossless compression with moderate error probability,” with Y. Altuğ and A.B. Wagner. *2013 IEEE International Symposium on Information Theory*, Istanbul, Turkey, July 2013.
- C15. “Bayesian model selection and inference for discrete time series.” **Invited talk**, *1st Workshop on Cognition and Control*, University of Florida, February 2013.
- C16. “Bayesian inference for discrete time series via tree weighting,” with M. Skoularidou and A. Panotopoulou. **Invited paper**, *2012 IEEE Information Theory Workshop*, Lausanne, Switzerland, September 2012.
- C17. “Sunset inequalities for differential entropy and mutual information,” with M. Madiman. *2012 IEEE International Symposium on Information Theory*, M.I.T., Cambridge, MA, July 2012.
- C18. “Lossless data compression rate: Asymptotics and non-asymptotics,” with S. Verdú. **Invited paper**, *46th Annual Conference on Information Sciences and Systems*, Princeton, NJ, March 2012.
- C19. “Sunset differential entropy bounds,” with M. Madiman. **Invited talk**, *International Zurich Seminar on Communications*, Zurich, Switzerland, March 2012.
- C20. “Differential entropy sunset bounds.” **Invited talk**, *Fourth EPFL-UMLV International Workshop on Random Matrices, Information Theory and Applications*, Paris, France, December 2010.
- C21. “Markov chains and the spectra of nonlinear operators,” with S.P. Meyn. **Invited talk**, *Young Researchers in Analysis Workshop*, Athens, November 2010.
- C22. “Geometric ergodicity and the spectral gap of non-reversible Markov chains,” with Sean P. Meyn. **Invited talk**, *Fifth International Workshop on Applied Probability*, Madrid, Spain, July 2010.
- C23. “Stochastic analysis of the k -server problem on the circle,” with A. Anagnostopoulos, C. Dombry, N. Guillin-Plantard and E. Upfal. *21st International Meeting on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AoFA 2010)*, June-July 2010.
- C24. “The entropies of the sum and the difference of two IID random variables are not too different,” with M. Madiman. *2010 IEEE International Symposium on Information Theory*, Austin, TX, June 2010.
- C25. “Simulating the mean of a skip-free Markov chain,” with K.R. Duffy and S.P. Meyn. *Simulation of Networks Workshop*, Cambridge University, UK, June 2010.
- C26. “Superposition codes for Gaussian vector quantization,” with K. Rahnama Rad and S. Gitzenis. **Invited paper**, *2010 IEEE Information Theory Workshop*, Cairo, Egypt, January 2010.
- C27. “Which spectrum?” with S.P. Meyn. **Invited talk**, *Athens Workshop on MCMC Convergence and Estimation*, Athens, Greece, September 2009.
- C28. “Three non-asymptotic results in source coding and probability.” **Plenary talk**, *2009 Workshop on Information Theoretic Methods in Science and Engineering*, Tampere, Finland, August 2009.
- C29. “Waiting and matching: Patterns and entropy.” **Invited series of talks**, *Greek Stochastics α'* , Lefkada, Greece, August 2009.

- C30. “Control variates for MCMC.” *Greek Stochastics α'* , with P. Dellaportas and Z. Tsourti. Lefkada, Greece, August 2009.
- C31. “A criterion for the compound Poisson distribution to be maximum entropy,” with O. Johnson and M. Madiman. *2009 IEEE International Symposium on Information Theory*, Seoul, Korea, July 2009.
- C32. “Efficient random codebooks and databases for lossy data compression,” with C. Gioran. **Invited paper**, *2009 IEEE Information Theory Workshop*, Volos, Greece, June 2009.
- C33. “Information-theoretic ideas in Poisson approximation and estimation.” **Invited talk**, *Interface between Information Theory and Estimation Theory Workshop*, Princeton University, April 2009.
- C34. “Control variates as screening functions,” with S. Kyriazopoulou-Panagiotopoulou and S.P. Meyn. *Third International Conference on Performance Evaluation Methodologies and Tools*, Athens, Greece, October 2008.
- C35. “An information-theoretic development of compound Poisson approximation,” with A.D. Barbour, O. Johnson and M. Madiman. **Invited talk**, *Second EPFL-UMLV International Workshop on Entropy*, Lausanne, Switzerland, September 2008.
- C36. “Entropy and the ‘compound’ law of small numbers.” with O. Johnson and M. Madiman. **Invited talk**, *2008 Workshop on Information Theoretic Methods in Science and Engineering*, Tampere, Finland, August 2008.
- C37. “Information-theoretic bounds for compound Poisson approximation,” with A.D. Barbour, O. Johnson and M. Madiman. *7th World Congress in Probability and Statistics*, Singapore, July 2008.
- C38. “Thinning and information projections,” with P. Harremöes and O. Johnson. *2008 IEEE International Symposium on Information Theory*, Toronto, Canada, July 2008.
- C39. “Counting the primes using entropy.” **Invited paper**, *2008 IEEE Information Theory Workshop*, Porto, Portugal, May 2008.
- C40. “On the spectral theory of Markov chains.” **Invited paper**, *12th Panhellenic Conference in Mathematical Analysis*, Athens, Greece, May 2008.
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- C45. “Information-theoretic ideas in Poisson approximation and concentration.” **Invited series of talks**, *LMS/EPSRC Meeting on Stochastic Stability, Large Deviations and Coupling Methods*, Edinburgh, UK, September 2006.
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- C49. “From Poisson approximation to compound Poisson concentration via entropy.” **Invited talk**, *First EPFL-UMLV International Workshop on Entropy*, Lausanne, Switzerland, February 2006.
- C50. “Combining information from different sources: Some surprising phenomena,” with B. Lucena. **Invited paper**, *10th Panhellenic Conference on Informatics*, Volos, Greece, November 2005.
- C51. “Filtering: The case for *noisier* data,” with B. Lucena. *2005 IEEE Information Theory Workshop*, Rotorua, New Zealand, September 2005.
- C52. “Mutual information, synergy and some curious phenomena for simple channels,” with B. Lucena. *2005 IEEE International Symposium on Information Theory*, Adelaide, Australia, September 2005.
- C53. “Relative entropy and exponential deviation bounds for general Markov chains,” with L. Lastras-Montaño and S.P. Meyn. *2005 IEEE International Symposium on Information Theory*, Adelaide, Australia, September 2005.
- C54. “Concentration and relative entropy for compound Poisson distributions,” with M. Madiman. *2005 IEEE International Symposium on Information Theory*, Adelaide, Australia, September 2005.
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- C56. “Entropy, compound Poisson approximation, log-Sobolev inequalities and measure concentration,” with M. Madiman. *2004 IEEE Information Theory Workshop*, San Antonio, TX, October 2004.
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- C64. “Maximum likelihood estimation for lossy data compression,” with M. Harrison. **Invited paper**, *40th Annual Allerton Conference on Communication, Control, and Computing*, Allerton, IL, October 2002.
- C65. “Source coding exponents for zero-delay coding with finite memory,” with N. Merhav. *2002 IEEE International Symposium on Information Theory*, Lausanne, Switzerland, July 2002.
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- C68. “MDL ideas in lossy data compression.” **Invited talk**, *MSRI Information Theory Workshop*, Berkeley, CA, March 2002.
- C69. “The ODE method and spectral theory of Markov operators,” with J. Huang and S.P. Meyn. **Invited paper**, *Proceedings of the Stochastic Theory and Control Workshop*, Springer, New York, pp. 205–221, B. Pasik-Duncan (Editor), 2002.
- C70. “Precise limit theorems and multiplicative ergodicity for Markov processes,” with S.P. Meyn. *11th INFORMS Applied Probability Society Conference*, New York, NY, July 2001.
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- C75. “Critical behavior in source coding,” with A. Dembo. *2000 International Symposium on Information Theory and Its Applications*, Honolulu, Hawaii, November 2000.
- C76. “On rate-distortion theory as a convex selection problem.” **Invited paper**, *38th Annual Allerton Conference on Communication, Control & Computing*, October 2000.
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- C78. “Model selection via rate-distortion theory.” **Invited paper**, *34th Annual Conference on Information Sciences and Systems*, Princeton, NJ, March 2000.
- C79. “Probabilistic results for sphere packing in high dimensions.” *1999 Joint Statistical Meetings of IMS-ASA-ENAR/WNAR*, Baltimore, MD, August 1999.
- C80. “How well does the Shannon codebook compress?” *1999 Canadian Information Theory Workshop*, Kingston, Ontario, June 1999.
- C81. “Asymptotically optimal lossy Lempel-Ziv coding.” *1998 IEEE International Symposium on Information Theory*, MIT, Cambridge, MA, August 1998.
- C82. “Generalized waiting times and efficient lossy coding for memoryless sources.” *1998 IEEE Information Theory Workshop*, San Diego, CA, February 1998.
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- C84. “The asymptotics of waiting times between stationary processes.” *1997 Joint Statistical Meeting of IMS-ASA-ENAR/WNAR*, Anaheim, CA, August 1997.
- C85. “On the distribution of recurrence times and the exact asymptotics of Lempel-Ziv coding.” *1997 IEEE International Symposium on Information Theory*, Ulm, Germany, June–July 1997.
- C86. “Two refinements to Shannon’s source coding theorem.” *1997 IEEE International Symposium on Information Theory*, Ulm, Germany, June–July 1997.
- C87. “Progressive classification in the compressed domain for large EOS satellite databases,” with V. Castelli, C.S. Li and J.J. Turek. *1996 IEEE International Conference on Acoustics, Speech and Signal Processing*, Atlanta, GA, May 1996.

- C88. “Stationary entropy estimation via string matching,” with Yu.M. Suhov. *The Data Compression Conference DCC 96*, Snowbird, UT, April 1996.
- C89. “Prefixes and the entropy rate for long-range sources,” with Yu.M. Suhov. *1994 IEEE International Symposium on Information Theory*, Trondheim, Norway, June 1994.

Updated July 7, 2017.