

Effective Fractal Dimension Bibliography

John M. Hitchcock
jhitchco@cs.uwyo.edu

- [1] P. Albert, E. Mayordomo, and P. Moser. Bounded pushdown dimension vs Lempel Ziv information density. Technical Report arXiv:0704.2386 [cs.CC], Computing Research Repository, 2007.
- [2] P. Albert, E. Mayordomo, P. Moser, and S. Perifel. Pushdown compression. In *Proceedings of the 25th Annual Symposium on Theoretical Aspects of Computer Science*, pages 39–48. Springer-Verlag, 2008.
- [3] K. Ambos-Spies, W. Merkle, J. Reimann, and F. Stephan. Hausdorff dimension in exponential time. In *Proceedings of the 16th IEEE Conference on Computational Complexity*, pages 210–217. IEEE Computer Society, 2001.
- [4] L. Antunes, A. Matos, A. Souto, and P. Vit'anyi. Depth as randomness deficiency. *Theory of Computing Systems*, 45(4):724–739, 2009.
- [5] L. Antunes and A. Souto. Sophisticated infinite sequences. In *Proceedings of the Fourth Conference on Computability in Europe*, pages 25–34, 2008.
- [6] K. B. Athreya, J. M. Hitchcock, J. H. Lutz, and E. Mayordomo. Effective strong dimension in algorithmic information and computational complexity. *SIAM Journal on Computing*, 37(3):671–705, 2007.
- [7] R. Beigel, L. Fortnow, and F. Stephan. Infinitely-often autoreducible sets. *SIAM Journal on Computing*, 36(3):595–608, 2006.
- [8] L. Bienvenu. Kolmogorov-Loveland stochasticity and Kolmogorov complexity. In *Proceedings of the 24th Annual Symposium on Theoretical Aspects of Computer Science*, pages 260–271. Springer-Verlag, 2007.
- [9] L. Bienvenu. *Caractérisations de l'aléatoire par les jeux: imprédictibilité et stochasticité*. PhD thesis, Université de Provence, 2008.
- [10] L. Bienvenu, D. Doty, and F. Stephan. Constructive dimension and Turing degrees. *Theory of Computing Systems*, 45(4):740–755, 2009.
- [11] L. Bienvenu and W. Merkle. Reconciling data compression and Kolmogorov complexity. In *Proceedings of the 34th International Colloquium on Automata, Languages, and Programming*, pages 643–654. Springer-Verlag, 2007.

- [12] C. Bourke. Finite-state dimension of individual sequences. Master's thesis, University of Nebraska-Lincoln, 2004.
- [13] C. Bourke, J. M. Hitchcock, and N. V. Vinodchandran. Entropy rates and finite-state dimension. *Theoretical Computer Science*, 349(3):392–406, 2005.
- [14] C. S. Calude, L. Staiger, and S. A. Terwijn. On partial randomness. *Annals of Pure and Applied Logic*, 138(1–3):20–30, 2006.
- [15] C. S. Calude and M. Zimand. Algorithmically independent sequences. In *Proceedings of the Twelfth International Conference on Developments In Language Theory*. Springer-Verlag, 2008. To appear.
- [16] C. J. Conidis. Effective Packing Dimension Of Π_1^0 -Classes. *Proceedings of the American Mathematical Society*, 136(10):3655–3662, 2008.
- [17] C. J. Conidis. *Applications of computability theory*. PhD thesis, University of Chicago, 2009.
- [18] J. J. Dai, J. I. Lathrop, J. H. Lutz, and E. Mayordomo. Finite-state dimension. *Theoretical Computer Science*, 310(1–3):1–33, 2004.
- [19] D. Diamondstone and B. Kjos-Hanssen. Members of random closed sets. In *Proceedings of the 5th Conference on Computability in Europe*, pages 144–153, 2009.
- [20] D. Doty. Every sequence is decompressible from a random one. In *Proceedings of the Second Conference on Computability in Europe*, pages 153–162. Springer-Verlag, 2006.
- [21] D. Doty. Dimension extractors and optimal decompression. *Theory of Computing Systems*, 43(3–4):425–463, 2008.
- [22] D. Doty, X. Gu, J. H. Lutz, E. Mayordomo, and P. Moser. Zeta-dimension. In *Proceedings of the 30th International Symposium on Mathematical Foundations of Computer Science*, pages 283–294. Springer-Verlag, 2005.
- [23] D. Doty, J. H. Lutz, and S. Nandakumar. Finite-state dimension and real arithmetic. *Information and Computation*, 205(11):1640–1651, 2007.
- [24] D. Doty and P. Moser. Finite-state dimension and lossy decompressors. Technical Report arXiv:cs/0609096 [cs.CC], Computing Research Repository, 2006.
- [25] D. Doty and J. Nichols. Pushdown dimension. *Theoretical Computer Science*, 381(1–3):105–123, 2007.
- [26] R. Downey. Some recent progress in algorithmic randomness. In *Proceedings of the 29th International Symposium on Mathematical Foundations of Computer Science*, pages 42–83. Springer-Verlag, 2004.
- [27] R. Downey. Algorithmic randomness and computability. Manuscript, 2009.
- [28] R. Downey and N. Greenberg. Turing degrees of reals of positive effect packing dimension. *Information Processing Letters*, 108(5):298–303, 2008.

- [29] R. Downey and D. Hirschfeldt. *Algorithmic Randomness and Complexity*. Springer-Verlag. To appear.
- [30] R. Downey, D. R. Hirschfeldt, A. Nies, and S. A. Terwijn. Calibrating randomness. *Bulletin of Symbolic Logic*, 12(3):411–491, 2006.
- [31] R. Downey, W. Merkle, and J. Reimann. Schnorr dimension. *Mathematical Structures in Computer Science*, 16(5):789–811, 2006.
- [32] R. Downey and K. M. Ng. Effective packing dimension and traceability. *Notre Dame Journal of Formal Logic*. To appear.
- [33] S. A. Fenner. Gales and supergales are equivalent for defining constructive Hausdorff dimension. Technical Report arXiv:cs/0208044 [cs.CC], Computing Research Repository, 2002.
- [34] L. Fortnow, J. M. Hitchcock, A. Pavan, N. V. Vinodchandran, and F. Wang. Extracting Kolmogorov complexity with applications to dimension zero-one laws. In *Proceedings of the 33rd International Colloquium on Automata, Languages, and Programming*, pages 335–345. Springer-Verlag, 2006.
- [35] L. Fortnow and J. H. Lutz. Prediction and dimension. *Journal of Computer and System Sciences*, 70(4):570–589, 2005.
- [36] C. Glaßer, M. Ogihara, A. Pavan, A. Selman, and L. Zhang. Autoreducibility, mitoticity, and immunity. Technical Report TR05-011, Electronic Colloquium on Computational Complexity, 2005.
- [37] N. Greenber and J. S. Miller. Diagonally non-recursive functions and effective Hausdorff dimension. Submitted, 2009.
- [38] X. Gu. A note on dimensions of polynomial size circuits. *Theoretical Computer Science*, 359(1–3):176–187, 2006.
- [39] X. Gu and J. H. Lutz. Dimension characterizations of complexity classes. *Computational Complexity*. To appear.
- [40] X. Gu and J. H. Lutz. Effective dimensions and relative frequencies. In *Proceedings of the Fourth Conference on Computability in Europe*, pages 231–240. Springer-Verlag, 2008.
- [41] X. Gu, J. H. Lutz, and E. Mayordomo. Points on computable curves. In *Proceedings of the 47th Annual IEEE Symposium on Foundations of Computer Science*, pages 469–474. IEEE Computer Society, 2006.
- [42] X. Gu, J. H. Lutz, and P. Moser. Dimensions of Copeland-Erdős sequences. *Information and Computation*, 205(9):1317–1333, 2007.
- [43] R. C. Harkins and J. M. Hitchcock. Dimension, halfspaces, and the density of hard sets. In *Proceedings of the 13th Annual International Computing and Combinatorics Conference*, pages 129–139. Springer-Verlag, 2007.

- [44] M. Hauptmann. Scaled dimension and the Berman-Hartmanis conjecture. Technical Report 85300-CS, University of Bonn, 2008.
- [45] D. R. Hirschfeldt and S. A. Terwijn. Limit computability and constructive measure. In *Proceedings of IMS Workshop on Computational Prospects of Infinity*. To appear.
- [46] J. M. Hitchcock. MAX3SAT is exponentially hard to approximate if NP has positive dimension. *Theoretical Computer Science*, 289(1):861–869, 2002.
- [47] J. M. Hitchcock. *Effective Fractal Dimension: Foundations and Applications*. PhD thesis, Iowa State University, 2003.
- [48] J. M. Hitchcock. Fractal dimension and logarithmic loss unpredictability. *Theoretical Computer Science*, 304(1–3):431–441, 2003.
- [49] J. M. Hitchcock. Gales suffice for constructive dimension. *Information Processing Letters*, 86(1):9–12, 2003.
- [50] J. M. Hitchcock. Small spans in scaled dimension. *SIAM Journal on Computing*, 34(1):170–194, 2004.
- [51] J. M. Hitchcock. Correspondence principles for effective dimensions. *Theory of Computing Systems*, 38(5):559–571, 2005.
- [52] J. M. Hitchcock. Hausdorff dimension and oracle constructions. *Theoretical Computer Science*, 355(3):382–388, 2006.
- [53] J. M. Hitchcock. Online learning and resource-bounded dimension: Winnow yields new lower bounds for hard sets. *SIAM Journal on Computing*, 36(6):1696–1708, 2007.
- [54] J. M. Hitchcock, M. López-Valdés, and E. Mayordomo. Scaled dimension and the Kolmogorov complexity of Turing-hard sets. *Theory of Computing Systems*, 43(3-4):471–497, 2008.
- [55] J. M. Hitchcock, J. H. Lutz, and E. Mayordomo. Scaled dimension and nonuniform complexity. *Journal of Computer and System Sciences*, 69(2):97–122, 2004.
- [56] J. M. Hitchcock, J. H. Lutz, and E. Mayordomo. The fractal geometry of complexity classes. *SIGACT News*, 36(3):24–38, September 2005.
- [57] J. M. Hitchcock, J. H. Lutz, and S. A. Terwijn. The arithmetical complexity of dimension and randomness. *ACM Transactions on Computational Logic*, 8(2):article 13, 2007.
- [58] J. M. Hitchcock and A. Pavan. Resource-bounded strong dimension versus resource-bounded category. *Information Processing Letters*, 95(3):377–381, 2005.
- [59] J. M. Hitchcock and A. Pavan. Hardness hypotheses, derandomization, and circuit complexity. *Computational Complexity*, 17(1):119–146, 2008.
- [60] J. M. Hitchcock, A. Pavan, and N. V. Vinodchandran. Partial bi-immunity, scaled dimension, and NP-completeness. *Theory of Computing Systems*, 42(2):131–142, 2008.

- [61] J. M. Hitchcock and N. V. Vinodchandran. Dimension, entropy rates, and compression. *Journal of Computer and System Sciences*, 72(4):760–782, 2006.
- [62] B. Kjos-Hanssen. Infinite subsets of random sets of integers. Manuscript, 2008.
- [63] B. Kjos-Hanssen and A. Nerode. Effective dimension of points visited by brownian motion. *Theoretical Computer Science*, 410(4–5):347–354, 2008.
- [64] V. Kreinovich and L. Longpré. Kolmogorov complexity leads to a representation theorem for idempotent probabilities (σ -maxitive measures). *SIGACT News*, 36(3):107–112, September 2005.
- [65] M. López-Valdés. Lempel-Ziv dimension for Lempel-Ziv compression. In *Proceedings of the 31st International Symposium on Mathematical Foundations of Computer Science*, pages 693–703. Springer-Verlag, 2006.
- [66] M. López-Valdés. Scaled dimension of individual strings. Technical Report TR06-047, Electronic Colloquium on Computational Complexity, 2006.
- [67] M. López-Valdés and E. Mayordomo. Dimension is compression. In *Proceedings of the 30th International Symposium on Mathematical Foundations of Computer Science*, pages 676–685. Springer-Verlag, 2005.
- [68] J. H. Lutz. Gales and the constructive dimension of individual sequences. In *Proceedings of the 27th International Colloquium on Automata, Languages, and Programming*, pages 902–913. Springer-Verlag, 2000. Revised as [70].
- [69] J. H. Lutz. Dimension in complexity classes. *SIAM Journal on Computing*, 32(5):1236–1259, 2003.
- [70] J. H. Lutz. The dimensions of individual strings and sequences. *Information and Computation*, 187(1):49–79, 2003.
- [71] J. H. Lutz. The dimension of a point: Computability meets fractal geometry. In *Proceedings of New Computational Paradigms: First Conference on Computability in Europe*, page 299. Springer-Verlag, 2005.
- [72] J. H. Lutz. Effective fractal dimensions. *Mathematical Logic Quarterly*, 51:62–72, 2005.
- [73] J. H. Lutz. A divergence formula for randomness and dimension. In *Proceedings of the 5th Conference on Computability in Europe*, 2009.
- [74] J. H. Lutz and E. Mayordomo. Dimensions of points in self-similar fractals. *SIAM Journal on Computing*, 38:1080–1112, 2008.
- [75] J. H. Lutz and K. Weihrauch. Connectivity properties of dimension level sets. *Mathematical Logic Quarterly*, 54(5):483–491, 2008.
- [76] E. Mayordomo. A Kolmogorov complexity characterization of constructive Hausdorff dimension. *Information Processing Letters*, 84(1):1–3, 2002.

- [77] E. Mayordomo. Effective Hausdorff dimension. In B. Löwe, B. Piwinger, and T. Räscher, editors, *Classical and New Paradigms of Computation and their Complexity Hierarchies*, volume 23 of *Trends in Logic*, pages 171–186. Kluwer Academic Press, 2004.
- [78] E. Mayordomo. Two open problems on effective dimension. In *Proceedings of Second Conference on Computability in Europe*, pages 353–359. Springer-Verlag, 2006.
- [79] E. Mayordomo. Effective fractal dimension in algorithmic information theory. In S. B. Cooper, B. Löwe, and A. Sorbi, editors, *New Computational Paradigms: Changing Conceptions of What is Computable*, pages 259–285. Springer-Verlag, 2008.
- [80] W. Merkle, J. S. Miller, A. Nies, J. Reimann, and F. Stephan. Kolmogorov-Loveland randomness and stochasticity. *Annals of Pure and Applied Logic*, 138(1–3):183–210, 2006.
- [81] J. S. Miller. Extracting information is hard: a Turing degree of non-integral effective Hausdorff dimension. *Advances in Mathematics*. To appear.
- [82] J. S. Miller and A. Nies. Randomness and computability: open questions. *Bulletin of Symbolic Logic*, 12(3):390–410, 2006.
- [83] P. Moser. BPP has effective dimension at most $1/2$ unless $BPP = EXP$. Technical Report TR03-029, Electronic Colloquium on Computational Complexity, 2003.
- [84] P. Moser. *Derandomization and Quantitative Complexity*. PhD thesis, Université de Genève, 2004.
- [85] P. Moser. Generic density and small span theorem. *Information and Computation*, 206(1):1–14, 2008.
- [86] P. Moser. Martingale families and dimension in P. *Theoretical Computer Science*, 400(1–3):46–61, 2008.
- [87] S. Nandakumar. A characterization of constructive dimension. In *Proceedings of the Fourth International Conference on Computability and Complexity in Analysis*, pages 323–337, 2008.
- [88] K. M. Ng. *Computability, Traceability and Beyond*. PhD thesis, Victoria University of Wellington, 2009.
- [89] A. Nies and J. Reimann. A lower cone in the wtt degrees of non-integral effective dimension. In *Proceedings of IMS Workshop on Computational Prospects of Infinity*. To appear.
- [90] S. Reid. The classes of algorithmically random reals. Master’s thesis, Victoria University of Wellington, 2003.
- [91] J. Reimann. Randomness beyond Lebesgue measure. In *Proceedings of Logic Colloquium 06*. To appear.
- [92] J. Reimann. *Computability and fractal dimension*. PhD thesis, Ruprecht-Karls Universität Heidelberg, 2004.
- [93] J. Reimann. Effectively closed sets of measures and randomness. *Annals of Pure and Applied Logic*, 156:170–182, 2008.

- [94] J. Reimann and F. Stephan. Effective Hausdorff dimension. In M. Baaz, S. D. Friedman, and J. Krajíček, editors, *Logic Colloquium '01*, volume 20 of *Lecture Notes in Logic*, pages 369–385. Association for Symbolic Logic, 2005.
- [95] J. Reimann and F. Stephan. Hierarchies of randomness tests. In *Proceedings of the 9th Asian Logic Conference*. World Scientific Publishing, 2006.
- [96] L. Staiger. Constructive dimension equals Kolmogorov complexity. *Information Processing Letters*, 93(3):149–153, 2005.
- [97] F. Stephan. Hausdorff-dimension and weak truth-table reducibility. In D. Zambella, K. Kearnes, A. Andretta, editor, *Logic Colloquium 2004*, volume 29 of *Lecture Notes in Logic*, pages 157–167. Association for Symbolic Logic, 2008.
- [98] K. Tadaki. Partial randomness and dimension of recursively enumerable reals. In *Proceedings of the 34th International Symposium on Mathematical Foundations of Computer Science*, pages 687–699, 2009.
- [99] S. A. Terwijn. Complexity and randomness. *Rendiconti del Seminario Matematico di Torino*, 62(1):1–38, 2004.
- [100] D. Turetsky. Connectedness properties of dimension level sets. Manuscript, 2009.
- [101] F. Wang. Kolmogorov extraction and resource-bounded zero-one laws. Master’s thesis, Iowa State University, 2006.
- [102] M. Zimand. Two sources are better than one for increasing the Kolmogorov complexity of infinite sequences. Technical Report arXiv:0705.4658 [cs.IT], Computing Research Repository, 2007.