

All publications by Paul C. Kainen as of July 27, 2005

References

- [1] T. L. Saaty and P. C. Kainen, **The Four-Color Problem: Assaults and Conquest**, McGraw-Hill, New York, 1977; reprinted by Dover Publications, New York, 1986.

Neural nets & nonlinear approximation

- [2] P. C. Kainen, V. Kůrková and A. Vogt, Upper bounds on variation with respect to half-spaces, in preparation.
- [3] P. C. Kainen, V. Kůrková and A. Vogt, Integral combinations of Heavisides, submitted for publication 2005.
- [4] P. C. Kainen, Replacing points by compacta in neural network approximation, *J. Franklin Inst.*, **341/4** (2004) 391–399.
- [5] P. C. Kainen, V. Kůrková and M. Sanguineti, Minimization of error functionals under weakened compactness, *SIAM J. of Optimization* **14** (2003) 732–742.
- [6] P. C. Kainen, V. Kůrková and A. Vogt, Best approximation by linear combinations of characteristic functions of half-spaces, *J. of Approximation Theory* **122** (2003) 151–159.
- [7] P. C. Kainen and V. Kůrková, Review of **Feedforward Neural Network Methodology**, by T. L. Fine, *IEEE Trans. on Neural Networks* **12** (2001) no. 3, 647-648.
- [8] P. C. Kainen, Predicting in Prague (Meeting report on 5th ICANN-NGA, 2001), *Trends in Cognitive Sciences* **5** (2001) no. 10, 409-410.
- [9] P. C. Kainen, V. Kůrková and A. Vogt, Continuity of approximation by neural networks in L_p -spaces. **Optimization with data**

perturbations II, D. E. Ward, D. Klatte, J.-J. Rückmann, Eds., *Annals of Operations Research* **101** (2001) 143–147.

- [10] P. C. Kainen, V. Kůrková and A. Vogt, Geometry and topology of best and near best approximation, *J. of Approximation Theory* **105** (2000) 252–262.
- [11] P. C. Kainen, V. Kůrková and A. Vogt, Best approximation by Heaviside perceptron networks, *Neural Networks* **13** (2000) 695–697.
- [12] P. C. Kainen, Convex geometry and nonlinear approximation, in **Proc. International Joint Conference on Neural Networks** (IJCNN 2000), vol. I, IEEE Press, Piscataway, NJ, 2000, pp. 299–304.
- [13] P. C. Kainen, V. Kůrková and A. Vogt, An integral formula for Heaviside neural networks, *Neural Network World* **10** (2000) 313–320.
- [14] P. C. Kainen, V. Kůrková and A. Vogt, Approximation by neural networks is not continuous, *Neurocomputing* **29** (1999) 47–56.
- [15] P. C. Kainen, Recent results and mathematical methods for functional approximation by neural networks, Chapter 15 in **Dealing with Complexity**, M. Karny, K. Warwick and V. Kůrková, Eds., Springer, London, 1998, pp. 220–237
- [16] V. Kůrková, P. C. Kainen and V. Kreinovich, Estimates of the number of hidden units and variation with respect to half-spaces, *Neural Networks* **10** (1997) 1061–1068.
- [17] P. C. Kainen, Utilizing geometric anomalies of high dimension: When complexity makes computation easier, Chapter 18 in **Computer-Intensive Methods in Control and Signal Processing**, K. Warwick and M. Karny, Eds., Birkhäuser, Boston, 1997, pp. 283–294.
- [18] V. Kůrková and P. C. Kainen, Singularities of finite scaling functions, *Applied Math. Letters* **9** (1996) 33–37.

- [19] V. Kůrková and P. C. Kainen, A geometric method to obtain error-correcting classification by neural networks with fewer hidden units, **Proceedings of the International Conference on Neural Networks**, vol. 2, IEEE Press, Piscataway, NJ, 1996, pp. 1227–1232.
- [20] V. Kůrková, P. C. Kainen and V. Kreinovich, Dimension-independent rates of approximation by neural networks and variation with respect to half-spaces, in **World Congress on Neural Networks**, INNS Press, vol. I, 1995, pp. 54–57.
- [21] O. Sirisaengtaksin, P. C. Kainen, V. Kreinovich and V. Kůrková, For neural networks, even approximate function determines form. *J. of Neural, Parallel and Scientific Computations*, **2** 1995 424–426.
- [22] V. Kůrková and P. C. Kainen, Functionally equivalent feedforward neural networks, *Neural Computation* **6** (1994) 543–558.
- [23] V. Kůrková and P. C. Kainen, Fuzzy orthogonal dimension and error-correcting classification by perceptron type networks, preprint, Industrial Math, FTT'94
- [24] P. C. Kainen, V. Kůrková, V. Kreinovich and O. Sirisengtaksin, Uniqueness of network parameterization and faster learning, *J. of Neural, Parallel and Scientific Computations*, **1** 1994 459–466.

Graph theory

- [25] P. C. Kainen and S. Overbay, Book thickness of graphs, III, in preparation.
- [26] P. C. Kainen, On robust cycle bases, in **Graph Theory, Combinatorics, Algorithms, and Applications**, Y. Alavi, D. M. Jones, D. R. Lick and J. Liu, Eds., *Electronic Notes in Discrete Mathematics* **11** (July 2002) 430–437, <http://www.sciencedirect.com/>

- [27] P. C. Kainen, A graph-theoretic model for time, in **Proceedings of the 4th International Conference on Computing Anticipatory Systems**, D. Dubois, Ed., American Institute of Physics, AIP Conference Proceedings 573, June, 2001, pp. 490–495. (This article won a “best paper” award at the conference.)
- [28] F. Harary, P. C. Kainen and A. Riskin, Every graph of cyclic bandwidth 3 is toroidal, *Bull. of the Inst. of Combinatorics and its Applications* **27** (1999) 81–84.
- [29] P. C. Kainen, Paradoxical order, **Erdős memorial issue**, *Geombinatorics* **6** (1997) no. 3, 85–89.
- [30] F. Harary and P. C. Kainen, On the dichromatic index of a digraph, *Quaestiones Math.* **19** (1996) no. 1–2, 325–329.
- [31] P. C. Kainen, An upper bound for total chromatic numbers, in **Graph Theory, Combinatorics, and Applications**, Vol. 1, Y. Alavi and A. Schwenk, Eds., Wiley, 1995; pp. 611–615.
- [32] F. Harary and P. C. Kainen, The cube of a path is maximal planar, *Bull. of the Inst. of Combinatorics and its Applications* **7** (1993) 55–56.
- [33] P. C. Kainen, Is the four color theorem true? *Geombinatorics* **3** (1993) no. 2, 41–56.
- [34] P. C. Kainen, Is the chromatic number of the plane robust? *Geombinatorics* **2** (1992) no. 2, 33–36.
- [35] P. C. Kainen, Upper bound for linear arboricity, *Appl. Math. Lett.* **4** (1991) no. 4, 53–55.
- [36] P. C. Kainen, The book thickness of a graph. II, **Proceedings of the Twentieth Southeastern Conference on Combinatorics, Graph Theory, and Computing**, *Congr. Numer.* **71** (1990), 127–132.
- [37] P. C. Kainen, Arboricity and edge partitions, **Graph theory, combinatorics, algorithms, and applications**, Y. Alavi et al., Eds., SIAM, Philadelphia, 1991, pp. 281–285.

- [38] P. C. Kainen, The significance of the four-color problem, **Proceedings of the West Coast Conference on Combinatorics, Graph Theory and Computing**, *Congress. Numer.*, **XXVI**, Utilitas Math., Winnipeg, Man., 1980, pp. 49–66.
- [39] F. Bernhart and P. C. Kainen, The book thickness of a graph, *J. Combin. Theory Ser. B* **27** (1979) no. 3, 320–331.
- [40] P. Erdős, S. H. Hechler, and P. C. Kainen, On finite superuniversal graphs, *Discrete Math.* **24** (1978) no. 3, 235–249.
- [41] P. C. Kainen and A. T. White, On stable crossing numbers, *J. Graph Theory* **2** (1978) no. 3, 181–187.
- [42] P. C. Kainen, Long and short walks in trees, **Theory and applications of graphs**, Lecture Notes in Math. 642, Springer, Berlin, 1978, pp. 309–313.
- [43] F. Harary and P. C. Kainen, On triangular colorings of a planar graph, *Bull. Calcutta Math. Soc.* **69** (1977) no. 6, 393–395.
- [44] P. C. Kainen, Chromatic number and skewness, *J. Combinatorial Theory Ser. B* **18** (1975) 32–34.
- [45] P. C. Kainen, Some recent results in topological graph theory, **Graphs and combinatorics**, R. A. Bari and F. Harary, Eds., Lecture Notes in Math. 406, Springer, Berlin, 1974, pp. 76–108.
- [46] S. H. Hechler and P. C. Kainen, On the immersion of digraphs in cubes, *Israel J. Math.* **18** (1974) 221–233.
- [47] P. C. Kainen, A generalization of the 5-color theorem, *Proc. Amer. Math. Soc.* **45** (1974) 450–453.
- [48] P. C. Kainen, Thickness and coarseness of graphs, *Abh. Math. Sem. Univ. Hamburg* **39** (1973) 88–95.
- [49] F. Harary, P. C. Kainen and A. J. Schwenk, Toroidal graphs with arbitrarily high crossing numbers, *Nanta Math.* **6** (1973) no. 1, 58–67.

- [50] F. Harary, P. C. Kainen, A. J. Schwenk, A. T. White, A maximal toroidal graph which is not a triangulation, *Math. Scand.* **33** (1973) 108–112.
- [51] P. C. Kainen, The Lie product of graphs, **Proceedings of the Fourth Southeastern Conference on Combinatorics, Graph Theory and Computing**, Utilitas Math., Winnipeg, Man., 1973, pp. 381–386.
- [52] P. C. Kainen, Relative colorings of graphs, *J. Combinatorial Theory Ser. B* **14** (1973) 259–262.
- [53] P. C. Kainen, On the stable crossing number of cubes, *Proc. Amer. Math. Soc.* **36** (1972) 55–62.
- [54] P. C. Kainen, A lower bound for crossing numbers of graphs with applications to K_n , $K_{p,q}$, and $Q(d)$, *J. Combinatorial Theory Ser. B* **12** (1972) 287–298.
- [55] P. C. Kainen, On the chromatic number of certain 2-complexes, **Proceedings of the Third Southeastern Conference on Combinatorics, Graph Theory, and Computing**, Florida Atlantic Univ., Boca Raton, Fla., 1972, pp. 291–295.
- [56] P. C. Kainen, On the chromatic number of a pinched manifold, preprint, Case Western Reserve University, 1972.
- [57] P. C. Kainen, Trivalent descriptions of graphs, **Proceedings of the Second Louisiana Conference on Combinatorics, Graph Theory and Computing**, Louisiana State Univ., Baton Rouge, La., 1971, pp. 331–338.
- [58] P. C. Kainen, Embeddings and orientations of graphs, **Combinatorial Structures and their Applications**, Gordon and Breach, New York, 1970, pp. 193–196.
- [59] P. C. Kainen, On a problem of P. Erdős, *J. Combinatorial Theory* **5** (1968) 374–377.

Geometry, topology & algebraic topology

- [60] P. C. Kainen, Isolated squares in hypercubes and robustness of commutativity, *Cahiers Topologie Geom. Differentielle Categ.* **XLIII** (2002) 213–220.
- [61] P. C. Kainen, An octonion model for physics, **Proceedings of ECHO IV Conference**, (Odense, Denmark, August, 2000), to appear after the heat death of the universe - also on my website.
- [62] P. C. Kainen, Newton, Klein, Kauffman, Cayley and the Four Color Problem, abstract for Knots in Washington, XI, Dec. 2000.
- [63] P. C. Kainen, Quantum interpretations of the four color theorem, technical report, Department of Mathematics, Georgetown University, May, 1999.
- [64] P. C. Kainen and V. Kůrková, Quasiorthogonal dimension of Euclidean spaces, *Applied Math. Letters* **6** (1993) 7–10.
- [65] P. C. Kainen, A uniform bound for rearranged vector sums, *Geombinatorics* **3** (1993) 10–12.
- [66] P. C. Kainen, Every commutative square of abelian groups can be realized by a homotopy commutative square of Moore, or co-Moore, spaces, *J. London Math. Soc. (2)* **5** (1972) 577–583.
- [67] P. C. Kainen, Weak adjoint functors, *Math. Zeit.* **122** (1971) 1–9.
- [68] P. C. Kainen, Universal coefficient theorems for generalized homology and stable cohomotopy, *Pacific J. Math.* **37** (1971) 397–407.
- [69] P. C. Kainen, On microbundles, preprint, Cornell University, 1968.
- [70] P. C. Kainen, On undersequences, undergraduate honors thesis, George Washington University, 1966.

Heuristics, Psychophysics, & Bio-computation

- [71] P. C. Kainen, Category theory and living systems, in preparation.
- [72] P. C. Kainen, Topological constancy in the visual perception of resonance, in preparation.
- [73] P. C. Kainen, The role of mathematics in heuristic performance, *Behavioral and Brain Sciences* **23** 2000 no. 5, 755-756; review of **Simple Heuristics That Make Us Smart** (by Gerd Gigerenzer, Peter M. Todd and the ABC Research Group, 1999).
- [74] P. C. Kainen, Mathematical cognition, *J. of Evolution and Cognition* **4** (1998) 81–89.
- [75] P. C. Kainen, D. F. Mondaini, R. Mondaini, N. Maculan and F. Montenegro, A geometric approach to DNA computing, abstract for poster session, 3rd DIMACS Workshop on DNA Based Computers, Philadelphia, 1997.
- [76] P. C. Kainen, Life as robust mathematics, technical report, Industrial Math, 1997.
- [77] P. C. Kainen, Abstract computation in biology, **Actes du Symposium ECHO** (Amiens, 1996), A. C. Ehresmann, G. L. Farre and J.-P. Vanbremeersch, Eds., Université de Picardie Jules-Verne, 1996, 101–107.
- [78] P. C. Kainen, Synergy vs. schema, *Brain and Behavioral Science* **17** no. 2 (1994), 212 and 230 (commentary and author response re: M. Jeannerod, The representing brain: Neural correlates of motor intention and imagery, same journal and issue, pp. 187–245, including commentaries and responses).
- [79] P. C. Kainen, From trees to topoi, **Proceedings of Baden-Baden 1995** G. L. Farre and G. Lasker, Eds., 1995.
- [80] P. C. Kainen, Graph heuristics for biomolecules, *Nanobiology* **1** (1992) 469–476.

- [81] P. C. Kainen, Functorial cybernetics of attention, Chap. 57 in **Neurocomputers and Attention** (Proc. of Moscow, 1989), vol. II, A. V. Holden and V. I. Kryukov, Eds., Manchester Univ. Press, 1992.
- [82] P. C. Kainen, On parallel heuristics, *Neural Network World* **5** (1991) 281–286.
- [83] P. C. Kainen, Biophysical application of Goguen’s theorem, technical report, Industrial Math, 1991.
- [84] P. C. Kainen, Categorical coordination of muscular action, in **Proc. 8th International Conference on Cybernetics and Systems** (New York, 1989), vol. I, C. N. Manikopoulos, Ed., NJIT Press, Newark, NJ, 1990, pp. 314–319.
- [85] P. C. Kainen, How are stable Lissajous figures perceived?, technical report, Industrial Math, 1990.
- [86] P. C. Kainen, Organic computation by adjoint resonance, technical report, Industrial Math, 1989.
- [87] P. C. Kainen, Mathematical theory in neurocomputing, technical report, Industrial Math, 1989.
- [88] P. C. Kainen, Color perception and Thomassen’s representation theorem, extended abstract for poster session, First International Neural Network Society (INNS88) meeting, Boston, 1988.
- [89] P. C. Kainen, Neural computation of Lissajous figures, extended abstract for poster session, INNS88, Boston, 1988.
- [90] P. C. Kainen, On the deployment of TASI-E, technical report, Bell Telephone Laboratories, 1981.
- [91] P. C. Kainen, On the psychophysics of TV, technical report, Bell Telephone Laboratories, 1979.
- [92] P. C. Kainen, Laser scan images, in **Eine Kleine Lichtmusik: A Sampler of Science/Art/Technology**, G. Edwards, Ed., National Science Foundation, 1979.