

# The Tower of Hanoi: A Bibliography

Paul K. Stockmeyer  
Department of Computer Science  
College of William and Mary  
*stockmeyer@cs.wm.edu*

Version 2.2  
September 12, 2005  
Corrected October 22, 2005

This is a substantially enlarged edition of the Tower of Hanoi bibliography first posted in 1997. In this edition, an attempt has been made to include every relevant document published during the first 100 years of the tower's history, from 1883 through 1983. Coverage is more selective in recent years. In particular, recent articles in psychological journals that discuss uses of the puzzle in testing of subjects, and articles in artificial intelligence that serve similar purposes, are generally not included, nor are textbooks in discrete mathematics or computer science that provide routine presentations of standard basic information.

The notation MR in a citation, when present, is followed by the new style 7-digit accession number in Mathematical Reviews, with the old style review citation in parentheses. Full descriptions of most of the journals cited can be found in the journal index at the end of the bibliography.

As always, readers are encouraged to send additions, comments, corrections, and suggestions to the author.

## Bibliography

- [1] Irving Adler, *Magic House of Numbers*, The John Day Company, New York, 1957, pp. 91–94. Revised Edition, 1974.
- [2] S. N. Afriat, *The Ring of Linked Rings*, Duckworth, London, 1982, pp. 93–116.
- [3] Hugh Aguilar, *Basic recursive techniques*, *Computer Language* **2** (1985), no. 5 (May), 43–46.

- [4] Alfred V. Aho, John E. Hopcroft, and Jeffrey D. Ullman, *The Design and Analysis of Computer Algorithms*, Addison-Wesley, Reading, Mass., 1974, pp. 71–72.
- [5] W. Ahrens, *Mathematische Unterhaltungen und Spiele*, B. G. Teubner, Leipzig, 1901, pp. 31–32. Second edition, in two volumes, 1910 and 1918; Third edition of volume I, 1921.
- [6] W. Ahrens, *Mathematische Spiele*, B. G. Teubner, Leipzig, 1907, pp. 59–63, 116. Second Edition, 1911; Third Edition, 1916; Fourth Edition, 1919; Fifth Edition, 1927.
- [7] R. E. Allardice and A. Y. Fraser, *La Tour d’Hanoï*, *Proceedings of the Edinburgh Mathematical Society* **2** (1884), 50–53.
- [8] Jean-Paul Allouche, *Tours de Hanoi et automates finis*, *Groupe de travail en théorie analytique et élémentaire des nombres*, 1986–1987, *Publ. Math. Orsay*, vol. 88, Univ. Paris XI, Orsay, 1988, pp. 1–3.
- [9] Jean-Paul Allouche, *Note on the cyclic Towers of Hanoi*, *Theoret. Comput. Sci.* **123** (1994), 3–7. MR1257199 (94k:05019).
- [10] Jean-Paul Allouche, Dan Astoorian, Jim Randall, and Jeffrey [O.] Shallit, *Morphisms, squarefree strings, and the Tower of Hanoi puzzle*, *Amer. Math. Monthly* **101** (1994), 651–658. MR1289274 (95g:68090).
- [11] Jean-Paul Allouche and Roland Bacher, *Toeplitz sequences, paperfolding, Towers of Hanoi and progression-free sequences of integers*, *Enseign. Math. (2)* **38** (1992), 315–327. MR1189010 (93j:11017).
- [12] J[ean]-P[aul] Allouche, J. Betrema, and J[effrey] O. Shallit, *Sur des points fixes de morphismes d’un monoïde libre*, *RAIRO Inform. Théor. Appl.* **23** (1989), 135–249. MR1020473 (91a:68154).
- [13] J[ean]-P[aul] Allouche and F. Dress, *Tours de Hanoï et automates*, *RAIRO Inform. Théor. Appl.* **24** (1990), 1–15. MR1060463 (91g:68060).
- [14] J[ean]-P[aul] Allouche and M. Mendès France, *Automata and automatic sequences*, *Beyond Quasicrystals* (Françoise Axel and Denis Gratias, eds.), Springer-Verlag, 1995, pp. 293–367. MR1420422 (97m:11029).
- [15] Jean-Paul Allouche and Amir Sapir, *Restricted Towers of Hanoi and Morphisms*, *Developments in Language Theory* (Clelia De Felice and Antonio Restivo, eds.), *Lecture Notes in Computer Science*, no. 3572, Springer, 2005, pp. 1–10.

- [16] A. V. Anisimov and S. V. Safronyuk, *Modeling recursion with the aid of iterative algorithms*, Program. Comput. Software **12** (1987), no. 3, 128–138. (Translated from the Russian journal Programirovanie **12** (1986), no. 3, 38–50.) MR0858684 (87j:68014).
- [17] Anonymous, *Der Zauberer im Familienkreise. Eine Sammlung leicht ausführbarer Experimente, Kunststücke, Belustigungen und Aufgaben aus der Physik, Mechanik, Arithmetik und Taschenspielerlei. Zur Unterhaltung in Familien- und Gesellschaftskreisen*, Julius Bagel, Mülheim a. d. Ruhr, 1889, pp. 26–28.
- [18] Anonymous, *Les tours de Hanoi*, Pentamino (1976), no. 2, 23.
- [19] Anonymous, *The Tower of Brahma*, Creative Computing **2** (1976), no. 1 (January/February), 25.
- [20] Anonymous (Édouard Lucas?), *Les jeux scientifiques*, Le Cosmos; Revue des sciences et de leurs applications, Nouvelle Série **XV** (39<sup>e</sup> année), no. 259 (11 Janvier 1890), 156–159.
- Dan Astoorian, see [10].
- [21] M. D. Atkinson, *The cyclic Towers of Hanoi*, Inform. Process. Lett. **13** (1981), no. 3, 118–119. MR0645457 (83f:68004).
- Moshe J. Augenstein, see [345].
- [22] Bonnie Averbach and Orin Chein, *Mathematics: Problem Solving Through Recreational Mathematics*, W. H. Freeman, New York, 1980, pp. 274–279.
- Roland Bacher, see [11].
- [23] Roland Backhouse and Maarten Fokkinga, *The associativity of equivalence and the Tower of Hanoi*, Inform. Process. Lett. **77** (2001), no. 2–4, 71–76.
- [24] R. M. Baer, *A biological model solution to the Towers of Hanoi problem*, Comput. J. **29** (1986), no. 4, 381–382.
- Theodore P. Baker, see [272].
- R.-A. Bakhtiar, see [188].
- [25] J. W. de Bakker and L. G. L. T. Meertens, *On the completeness of the inductive assertion method*, J. Comput. System Sci. **11** (1975), 323–357. MR0428755 (55:1775).

- [26] W. W. Rouse Ball, *Mathematical Recreations and Problems of Past and Present Times*, Macmillan and Co., London, 1892, pp. 78–79. Fourth (1905) and later editions published under the title *Mathematical Recreations and Essays*. Eleventh (1939) and later editions co-authored with H. S. M. Coxeter.
- [27] D. St. P. Barnard, *Adventures in Mathematics*, Pelham Books, London, 1965, pp. 52–55.
- [28] David T. Barnard, *The Towers of Hanoi: An Exercise in Non-Recursive Algorithm Development*, Tech. Report 80-103, Queen’s University, 1980.
- [29] David T. Barnard and Robert G. Crawford, *Pascal programming problems and applications*, Reston Publishing Company, Reston, VA, 1982, pp. 203–215.
- C. Douglass Bateman see [340].
- [30] Anatole Beck, Michael N. Bleicher, and Donald W. Crowe, *The  $n$ -dimensional cube and the tower of Hanoi*, Excursions into Mathematics, Worth Publishers, Inc., New York, 1969, pp. 40–54.
- [31] Hermann Becker, *150 Denkaufgaben*, Kesselringsche Verlagsbuchhandlung, Wiesbaden, 1952, pp. 58–59.
- [32] Catherine Becquaert, *Les tours de Hanoi*, Pentamino (1977), no. 3, 55–71.
- [33] J. Bendisch, *Generalized sequencing problem “Towers of Hanoi”*, Z. Oper. Res. Ser. A **29** (1985), no. 1 (March), 31–45. MR0793549 (86f:90098).
- [34] Elwyn R. Berlekamp, John H. Conway, and Richard K. Guy, *Winning Ways for your mathematical plays*, Academic Press, London, 1982, pp. 753–754. MR0654502 (84h:90091b).
- J. Betrema, see [12].
- [35] Albrecht Beutelspacher, *Luftschlösser und Hirngespinnste*, Friedr. Vieweg & Sohn, Braunschweig/Wiesbaden, 1986, pp. 80–86.
- [36] Graham Birtwistle, *The coroutines of Hanoi*, SIGPLAN Notices **20** (1985), no. 1 (January), 9–10.
- Somenath Biswas, see [203].
- [37] Gerald M. Blair, *A simple digital circuit for the Towers of Hanoi problem*, IEEE Trans. Ed. **40** (1997), no. 4 (November), 287–288.

- [38] Marc Blanchard, *Gènèralisation du jeu: “La Tour de Hanoi”*, Ludi-Math (Commission J.E.M.) **2** (sept. 1979), no. 4, 19–29.
- Michael N. Bleicher, see [30].
- [39] J. T. Boardman, C. Garrett, and G. C. A. Robson, *A recursive algorithm for the optimal solution of a complex allocation problem using a dynamic programming formulation*, Comput. J. **29** (1986), no. 2, 182–186.
- [40] J. T. Boardman and G. C. A. Robson, *Towards a problem-solving methodology for coping with increasing complexity: an engineering approach*, Comput. J. **29** (1986), no. 2, 161–166.
- [41] Jens-P. Bode and Andreas M. Hinz, *Results and open problems on the Tower of Hanoi*, Congr. Numer. **139** (1999), 113–122. (Proceedings of the Thirtieth Southeastern Conference on Combinatorics, Graph Theory, and Computing) MR1744234 (2000k:05030).
- [42] Al Borchers and Prosenjit Gupta, *Extending the quadrangle inequality to speed-up dynamic programming*, Inform. Process. Lett. **49** (1994), no. 6, 287–290.
- Jack Botermans, see [69] and [330].
- [43] Gaston Boucheny, *Curiosités et Récréations Mathématiques*, Librairie Larousse, Paris, 1939, pp. 123–124.
- [44] Brother Alfred Brousseau, *Tower of Hanoi with more pegs*, J. Recreational Math. **8** (1975-1976), no. 3, 169–176. Reprinted in *Mathematical Solitaires & Games*, Benjamin L. Schwartz, ed., Baywood Publishing Co., Inc., Farmingdale, NY, 1980, pp. 29–36.
- G. Brousseau, see [123].
- [45] Peter Brucker, *Über gewisse Prinzipien des Entwurfs effizienter Algorithmen*, 15th Styrian Mathematical Symposium (Graz, 1984), Berichte, Forschungszentrum Graz, Graz, 1984, pp. 1–21 of Ber. No. 233. MR0807801 (87c:90136).
- [46] P[eter] Buneman and L[eon] S. Levy, *Gray code gleanings*, Proceedings of the 1978 Conference on Information Sciences and Systems, Johns Hopkins University, 1978, pp. 199–202.
- [47] Peter Buneman and Leon [S.] Levy, *The Towers of Hanoi problem*, Inform. Process. Lett. **10** (1980), no. 4-5, 243–244. MR0585392 (81j:68043).
- [48] Otto Cato, *Unterhaltungsspiele für Einen*, Philipp Reclam, Leipzig, no year, pp. 22–30.

- [49] Joe Celko, *Mutants of Hanoi*, ABACUS **1** (1984), no. 3 (Spring), 54–57.
- [50] Joe Celko, *Addendum to “Mutants of Hanoi”*, ABACUS **5** (1988), no. 2 (Winter), 72.
- P. P. Chakrabarti, see [146].
- [51] Tat-Hung Chan, *A statistical analysis of the Towers of Hanoi problem*, Internat. J. Comput. Math. **28** (1989), 57–65.
- [52] Fouad B. Chedid and Toshiya Mogi, *A simple iterative algorithm for the Towers of Hanoi problem*, IEEE Trans. Ed. **39** (May 1996), no. 2, 274–275.
- Orin Chein, see [22].
- Rong-Jaye Chen, see [362] and [363].
- [53] Xiao Chen and Jian Shen, *On the Frame-Stewart conjecture about the Towers of Hanoi*, SIAM J. Comput. **33** (2004), no. 3, 584–589. MR2066643 (2003e:68179).
- S. C. Chiemeke, see [177] and [178].
- [54] I-Ping Chu and Richard Johnsonbaugh, *The four-peg Tower of Hanoi puzzle*, SIGCSE Bull. **23** (1991), no. 3 (September), 2–4.
- James W. Clark, see [340].
- [55] N. Claus (pseudonym for Édouard Lucas), *La Tour d’Hanoï: Véritable Casse-tête Annamite*, 1883. Original instruction sheet printed by Paul Bousrez, Tours.
- [56] N. Claus (pseudonym for Édouard Lucas), *La Tour d’Hanoï: Jeu de Calcul*, Science et Nature **1** (1884), no. 8 (January 19), 127–128.
- M. Clint, see [136].
- [57] Brian Cohen, *The mechanical discovery of certain problem symmetries*, Artificial Intelligence **8** (1977), 119–131. MR0455580 (56:13817).
- [58] A. W. Colijn, *A note on the multics command language*, Software — Practice and Experience **11** (1981), no. 7, 741–744.
- John H. Conway, see [34].
- Nicole Cookson, see [176].
- Edward Corwin, see [144].
- H. S. M. Coxeter, see [26].
- Robert G. Crawford, see [29].

- [59] D[onald] W. Crowe, *The  $n$ -dimensional cube and the Tower of Hanoi*, Amer. Math. Monthly **63** (1956), 29–30. MR0074841 (17:655h).
- Donald W. Crowe, see also [30].
- [60] W. D. Crowe and P. E. D. Strain-Clark, *A concurrent approach to the Towers of Hanoi*, Occam and the Transputer—Research and Applications (Proceedings of the 9th Occam User Group Technical Meeting) (Amsterdam) (Charlie Askew, ed.), IOS Press, 1988, pp. 13–22.
- [61] W. D. Crowe and P. E. D. Strain-Clark, *A concurrent approach to the Towers of Hanoi*, Specification and Verification of Concurrent Systems (C. Rattray, ed.), British Computer Society, Springer-Verlag, 1990, pp. 595–610.
- [62] Paul Cull and E. F. Ecklund, Jr., *On the Towers of Hanoi and generalized Towers of Hanoi problems*, Congr. Numer. **35** (1982), 229–238. (Proceedings of the 13<sup>th</sup> Southeastern Conference on Combinatorics, Graph Theory and Computing.) MR0725883 (85a:68059).
- [63] Paul Cull and E. F. Ecklund, Jr., *Towers of Hanoi and analysis of algorithms*, Amer. Math. Monthly **92** (1985), 407–420. MR0795250 (87a:68069).
- [64] Paul Cull and Colin Gerety, *Is Towers of Hanoi really hard?*, Congr. Numer. **47** (1985), 237–242. (Proceedings of the 16<sup>th</sup> Southeastern International Conference on Combinatorics, Graph Theory and Computing.)
- [65] Paul Cull and Ingrid Nelson, *Error-correcting codes on the towers of Hanoi graphs*, Discrete Math. **208/209** (1999), 157–175. MR1725528 (2001a:94048).
- [66] Paul Cull and Ingrid Nelson, *Perfect codes, NP-Completeness, and Towers of Hanoi graphs*, Bull. Inst. Combin. Appl. **26** (1999), 13–38. MR1683817 (2000h:94059).
- Paul Cull, see also [141].
- [67] I. Danicic, *Lisp Programming*, Blackwell, Oxford, 1983, pp. 3–6, 22–25.
- [68] Jean-Paul Delahaye, *Jeux mathématiques, et mathématiques des Jeux*, Bibliothèque Pour la Science, Paris, 1998, p. 91.
- [69] Pieter van Delft and Jack Botermans, *Creative Puzzles of the World*, Harry N. Abrams, Inc., New York, 1978, pp. 175,199.
- [70] Claude Delmez, *Les tours de Hanoi*, Math. Péd. **9** (1983), no. 44, 23–39.

- [71] R. M. DeSantis, P. Souphandavong, C. Ratzimbazafy, and R. Hureau, *Robotization of the hanoi tower puzzle via visual feedback*, Proceedings of the 1987 Summer Computer Simulation Conference (San Diego) (Jordan Q. B. Chou, ed.), SCS, 1987, pp. 822–825.
- [72] A. K. Dewdney, *Computer Recreations: Yin and yang: recursion and iteration, the Towers of Hanoi and the Chinese Rings*, Sci. Amer. **251** (1984), no. 5 (November), 19–28. Reprinted, with Addendum, in *The Armchair Universe: An Exploration of Computer Worlds*, W. H. Freeman and Co., New York, 1988, pp. 186–199.
- [73] Leroy J. Dickey, *Grey codes, Towers of Hanoi, Hamiltonian paths on the N-cube, and Chinese rings*, APL Quote Quad **24** (1993), no. 2 (December), 18–24.
- [74] Edsger W. Dijkstra, EWD316: A Short Introduction to the Art of Programming, (circulated privately), 1971, pp. 71–75. Unpublished, but available from the E. W. Dijkstra Archives at <http://www.cs.utexas.edu/users/EWD/welcome.html>. A preliminary version also exists as EWD287 (undated, but probably 1970).
- T. S. Dillon, see [232], [233], and [234].
- [75] A. P. Domoryad, *Mathematical Games and Pastimes* (Russian), Pergamon Press Ltd., Oxford, 1964, pp. 75–76. English translation by Halina Moss of *Matematicheskiye igry i razvlecheniya*, Fizmatgiz, Moscow, 1961. MR0123435 (23:A761).
- [76] Eric Doubleday, *Test your wits*, Vol. 2, Ace Books, New York, 1971, pp. 91–92.
- F. Dress, see [13].
- [77] R. G. Dromey, *How to solve it by computer*, Prentice Hall International, Inc., London, 1982, pp. 391–403.
- [78] Vladimir Dubrovsky, *Nesting puzzles, Part I: Moving oriental towers*, Quantum **6** (1996), no. 3 (January/February), 53–57, 49–51.
- [79] Henry E[rnest] Dudeney, *The Canterbury Puzzles: Some adventures of the famous pilgrims now recorded for the first time*, London Mag. **8** (1902), no. 46 (May), 367–371. Solutions appear in [80]. This article reprinted in [81].
- [80] Henry E[rnest] Dudeney, *The Canterbury Puzzles: Sequels to the adventures (recorded in our last number) that befell the famous pilgrims*, London Mag. **8** (1902), no. 47 (June), 480–482. Contains solutions to the puzzles in [79]. Modified versions of these solutions appear in [81].



- [81] Henry Ernest Dudeney, *The reve's puzzle*, The Canterbury Puzzles (and other curious problems), Thomas Nelson and Sons, Ltd., London, 1907. Second Edition, 1919. Contains the material of [79] and [80] in book form.
- [82] Henry Ernest Dudeney, *Modern Puzzles and how to solve them*, Frederick A. Stokes Company, New York, 1926, pp. 61, 151.
- [83] Henry Ernest Dudeney, *Puzzles and Curious Problems*, Thomas Nelson and Sons, Ltd., London, 1931, pp. 74, 165. Revised edition, edited by Martin Gardner, published by Charles Scribner's Sons, New York, 1967, pp.133–134, 339.
- [84] Otto Dunkel, *Editorial note concerning advanced problem 3918*, Amer. Math. Monthly **48** (1941), 219.
- [85] Daniel S. Eavarone and George W. Ernst, *A program that generates good difference orderings and tables of connections for GPS*, Systems for the seventies; Proceedings of the 1970 IEEE Systems Science and Cybernetics Conference, 1970, pp. 226–233.  
  
E. F. Ecklund, Jr., see [62] and [63].
- [86] Bleicke Eggers, *The Towers of Hanoi: Yet another nonrecursive solution*, SIGPLAN Notices **20** (1985), no. 9 (September), 32–42.
- [87] Harry Edwin Eiss, *Dictionary of mathematical games, puzzles, and amusements*, Greenwood Press, Inc., Westport, CT, 1988, pp. 251–254.
- [88] Joost Engelfriet, *The Trees of Hanoi*, Tech. Report 325, Twente University of Technology, Enschede, The Netherlands, 1981.
- [89] Harald Englisch and Renate Englisch, *Türme in Südostasien und die Dimension  $\log 3/\log 2$* , MNU **49/3** (15 April 1996), 138–140.  
  
Renate Englisch, see [89].
- [90] Susanna S. Epp, *Discrete Matheamtics with Applications*, Wadsworth Publishing Company, Belmont, CA, 1990, pp. 476–480, 488–89, Appendix B.
- [91] M. C. Er, *A representation approach to the Tower of Hanoi problem*, Comput. J. **25** (1982), no. 4, 442–447.
- [92] M. C. Er, *An iterative solution to the generalized Towers of Hanoi problem*, BIT **23** (1983), 295–302. MR0704996 (84g:68019).
- [93] M. C. Er, *An analysis of the generalized Towers of Hanoi problem*, BIT **23** (1983), 429–435. MR0721193 (85a:68060).

- [94] M. C. Er, *The cyclic Towers of Hanoi: A Generalization*, Egypt. Comput. J. **11** (1983), 91–99.
- [95] M. C. Er, *The colour Towers of Hanoi: A generalization*, Comput. J. **27** (1984), no. 1, 80–82.
- [96] M. C. Er, *The cyclic Towers of Hanoi: A representation approach*, Comput. J. **27** (1984), no. 2, 171–175.
- [97] M. C. Er, *The generalized colour Towers of Hanoi: An iterative algorithm*, Comput. J. **27** (1984), no. 3, 278–282. MR0761594 (86c:68030).
- [98] M. C. Er, *The Tower of Hanoi as a trivial problem—a reply*, Comput. J. **27** (1984), no. 3, 285.
- [99] M. C. Er, *A generalization of the cyclic Towers of Hanoi: An iterative solution*, Internat. J. Comput. Math. **15** (1984), 129–140. MR0747513 (86a:68031).
- [100] M. C. Er, *On the complexity of recursion in problem-solving*, Internat. J. Man-Machine Studies **20** (1984), 537–544.
- [101] M. C. Er, *An iterative algorithm for the cycle Towers of Hanoi problem*, Internat. J. Comput. Inform. Sci. **13** (1984), no. 2, 123–129. MR0761295 (86c:68029).
- [102] M. C. Er, *The generalized Towers of Hanoi problem*, J. Inform. Optim. Sci. **5** (1984), no. 1, 89–94.
- [103] M. C. Er, *The colour Towers of Hanoi—An iterative solution*, J. Inform. Optim. Sci. **5** (1984), no. 2, 95–104.
- [104] M. C. Er, *The Tower of Hanoi problem—a further reply*, Comput. J. **28** (1985), no. 5, 543–544.
- [105] M. C. Er, *The complexity of the generalized cyclic Towers of Hanoi problem*, J. Algorithms **6** (1985), 351–358. MR0800725 (86k:68035).
- [106] M. C. Er, *Towers of Hanoi with black and white discs*, J. Inform. Optim. Sci. **6** (1985), no. 1, 87–94. MR0793864 (86k:68036).
- [107] M. C. Er, *The Towers of Hanoi and binary numerals*, J. Inform. Optim. Sci. **6** (1985), no. 2, 147–152. MR0796981 (86m:68058).
- [108] M. C. Er, *Performance evaluations of recursive and iterative algorithms for the Towers of Hanoi problem*, Computing **37** (1986), 93–102. MR0854579 (87j:68051).

- [109] M. C. Er, *A loopless approach for constructing a fastest algorithm for the Towers of Hanoi problem*, *Internat. J. Comput. Math.* **20** (1986), 49–54.
- [110] M. C. Er, *The cyclic Towers of Hanoi and pseudo ternary codes*, *J. Inform. Optim. Sci.* **7** (1986), no. 3, 271–277.
- [111] M. C. Er, *A time and space efficient algorithm for the cyclic Towers of Hanoi problem*, *J. Inform. Process.* **9** (1986), no. 3, 163–165.
- [112] M. C. Er, *A general algorithm for finding a shortest path between two  $n$ -configurations*, *Inform. Sci.* **42** (1987), 137–141.
- [113] M. C. Er, *A loopless and optimal algorithm for the cyclic Towers of Hanoi problem*, *Inform. Sci.* **42** (1987), 283–287.
- [114] M. C. Er, *Counter examples to adjudicating a Towers of Hanoi contest*, *Internat. J. Comput. Math.* **21** (1987), 123–131.
- [115] M. C. Er, *An algorithmic solution to the multi-tower Hanoi problem*, *J. Inform. Optim. Sci.* **8** (1987), no. 1, 91–100.
- [116] M. C. Er, *An optimal algorithm for Reve’s puzzle*, *Inform. Sci.* **45** (1988), 39–49.
- [117] M. C. Er, *A minimal space algorithm for solving the Towers of Hanoi problem*, *J. Inform. Optim. Sci.* **9** (1988), 183–191. MR0964408 (90g:68107).
- [118] M. C. Er, *A linear space algorithm for solving the Towers of Hanoi problem by using a virtual disc*, *Inform. Sci.* **47** (1989), 47–52. MR0976714 (89k:68064).
- [119] M. C. Er, *A note on the optimality of a Reve algorithm*, *Comput. J.* **34** (1991), no. 6, 513.
- [120] George W. Ernst, *Sufficient conditions for the success of GPS*, *J. ACM* **16** (1969), no. 4, 517–533.
- [121] George W. Ernst and Allen Newell, *Some issues of representation in a general problem solver*, *AFIPS Conference Proceedings*, vol. 30, Thompson Books, Washington, D. C., 1967, pp. 583–600.
- [122] George W. Ernst and Allen Newell, *GPS: A Case Study in Generality and Problem Solving*, Academic Press, New York, 1969, pp. 150–164.

George W. Ernst, see also [85].

- [123] J.-C. Eyheraguibel and G. Brousseau, *Appareillage du mesure automatique des stratégies d'apprentissage*, Mesures - régulation - automatisme **43** (1978), no. 1, 43–55.
- Cyrus R. Eyster, see [340].
- [124] Peter Fellgett, *Letter to the editor*, Comput. J. **27** (1984), no. 4, 378–379.
- [125] Anthony S. Filipiak, 100 Puzzles - How to make and how to solve them, A. S. Barnes and Company, Inc., New York, 1942, pp. 114–115. Also published as *Mathematical Puzzles nad Other Brain Twisters* by Bell Publishing Co., New York.
- [126] Peter J. Floriani, *Letter to the editor*, SIGPLAN Notices **19** (1984), no. 12 (December), 7–10.
- Maarten Fokkinga, see [23].
- [127] Gary Ford, *A framework for teaching recursion*, SIGCSE Bull. **14** (1982), no. 2 (June), 32–39.
- [128] J.-C. Fournier, *Pour en finir avec la dérécursivation du problème des Tours de Hanoi*, RAIRO Inform. Théor. Appl. **24** (1990), 17–35.
- [129] J. S. Frame, *Solution to advanced problem 3918*, Amer. Math. Monthly **48** (1941), 216–217.
- [130] Wm. Randolph Franklin, *A simpler iterative solution to the Towers of Hanoi problem*, SIGPLAN Notices **19** (1984), no. 8 (August), 87–88.
- A. Y. Fraser, see [7].
- Henry Frith, see [347].
- [131] Jean Fromentin, *A propos d'un jeu: "La Tour de Hanoi"*, Ludi-Math (Commission J.E.M.) **2** ((sept. 1979)), no. 2, 9–17.
- [132] Artur Fürst and Alexander Moszkowski, *Das Buch der 1000 Wunder*, Albert Langen, München, 1920, pp. 203–204.
- [133] George Gamow, *One two three . . . infinity*, Viking Press, New York, 1947, pp. 9–11.
- [134] Martin Gardner, *Mathematical Games: About the remarkable similarity between the Icosian Game and the Tower of Hanoi*, Sci. Amer. **196** (1957), no. 5 (May), 150–156. Reprinted, with Addendum, as Chapter 6 of *The Scientific American*

*Book of Mathematical Puzzles & Diversions*, Simon and Schuster, New York, 1959. A later edition, with Afterword and new Bibliography, was published as *Hexaflexagons and other Mathematical Diversions*, University of Chicago Press, Chicago, 1988.

- [135] Martin Gardner, *Mathematical Games: The curious properties of the Gray code and how it can be used to solve puzzles*, *Sci. Amer.* **227** (1972), no. 2 (August), 106–109. Reprinted, with Answer, Addendum, and Bibliography, as Chapter 2 of *Knotted Doughnuts and Other Mathematical Entertainments*, W. H. Freeman and Co., New York, 1986.

Martin Gardner, see also [83] and [198].

C. Garrett, see [39].

- [136] D. Gault and M. Clint, *A fast algorithm for the Towers of Hanoi problem*, *Comput. J.* **30** (1987), no. 4, 376–378.

- [137] Thomas D. Gedeon, *Guided tour to the Towers of Hanoi*, *SIGPLAN Notices* **21** (1986), no. 6 (June), 11–12.

- [138] Thomas D. Gedeon, *Letter to the editor*, *SIGPLAN Notices* (1986), no. 12 (December), 14.

- [139] T[homas] D. Gedeon, *The Reve's puzzle: An iterative solution produced by transformation*, *Comput. J.* **35** (1992), no. 2, 186–187.

- [140] T[homas] D. Gedeon, *The cyclic Towers of Hanoi: An iterative solution produced by transformation*, *Comput. J.* **39** (1996), no. 4, 353–356.

Thomas D. Gedeon, see also [307] and [308].

Frank H. George, see [328].

- [141] Colin Gerety and Paul Cull, *Time complexity of the Towers of Hanoi problem*, *SIGACT News* **18** (1986), no. 1 (Summer), 80–88.

Colin Gerety, see also [64].

- [142] Italo Ghersi, *Mathematica Dilettevole e Curiosa*, Ulrico Hoepli, Milan, 1913, pp. 709–711.

S. Ghose, see [146].

- [143] Arthur Gill, *Machine and Assembly Language Programming of the PDP-11*, Prentice-Hall, Englewood Cliffs, NJ, 1978, pp. 74–79.

- [144] Arthur Gill, Edward Corwin, and Antonette Logar, *Assembly Language Programming for the 68000*, Prentice-Hall, Englewood Cliffs, NJ, 1987, pp. 81–85.
- F. Göbel, see [322].
- Arthur Good, see [348].
- [145] Ronald L. Graham, Donald E. Knuth, and Oren Patashnik, *Concrete mathematics: A foundation for computer science*, Addison-Wesley, Reading, MA, 1989. Second Edition, 1994.
- Martin Harry Greenberg, see [311].
- P. M. Grundy, see [324].
- [146] P. Gupta, P. P. Chakrabarti, and S. Ghose, *The Towers of Hanoi: Generalizations, specializations, and algorithms*, *Internat. J. Comput. Math.* **46** (1992), 149–161.
- Prosenjit Gupta, see [42].
- Richard K. Guy, see [34].
- A. Halder, see [258].
- Matthew T. Harrison, see [340].
- J. R. Hayes, see [200].
- [147] P. J. Hayes, *A note on the Towers of Hanoi problem*, *Comput. J.* **20** (1977), no. 3, 282–285.
- [148] R. J. Heard, *The Tower of Hanoi as a trivial problem*, *Comput. J.* **27** (1984), 90.
- [149] R. J. Heard, *Further remarks on the trivial nature of the Tower of Hanoi problem*, *Comput. J.* **28** (1985), no. 5, 543.
- [150] R. J. Heard, *The Tower of Hanoi—again*, *Comput. J.* **29** (1986), no. 4, 381.
- Lorenz Hempel, see [184].
- [151] K. Hemprich, *Spielpeterle und Rätefritze*, Dürr, Leipzig, 1926, pp. 33–35.
- [152] A. Héraud, *Jeux et Récréations Scientifiques – Chimie, Histoire Naturelle, Mathématiques.*, J.-B. Baillière et Fils, Paris, 1903, pp. 299–302 and 305–307. Not in 1884 edition. Lifted almost entirely from [56]

- [153] Hermann Hering, *Zur Mathematisierung des “Turm von Hanoi”-Spiels*, MNU **26** (1973), 408–411.
- [154] Hermann Hering, *Minimalstrategien in endlichen Systemen*, MU **23** (1977), no. 4, 19–35.
- [155] H[ermann] Hering, *Varianten zum “Turm von Hanoi-Spiel” – ein Weg zu einfachen Funktionalgleichungen*, MU **25** (1979), no. 2, 82–92.
- [156] George F. Hervey, *Tower of Hanoy*, Teach yourself card games for one: patiences — solitaires, The English Universities Press Ltd., London, 1965, pp. 63–65.
- [157] George F. Hervey, *Tower of Hanoy*, The Illustrated book of Card Games for One, Hamlyn, London, 1977, pp. 60–61.
- [158] Margarete und Heinz Heß, *Hamiltonsche Linien*, MU **24** (1978), no. 3, 5–40.
- [159] Teruo Hikita, *On a class of recursive procedures and equivalent iterative ones*, Acta Inform. **12** (1979), 305–320. MR0553780 (80k:68020).
- [160] A[ndreas] M. Hinz, *An iterative algorithm for the Tower of Hanoi with four pegs*, Computing **42** (1989), 133–140. MR1014293 (91b:05025).
- [161] Andreas M. Hinz, *The Tower of Hanoi*, Enseign. Math. (2) **35** (1989), 289–321. MR1039949 (91k:05015).
- [162] Andreas M. Hinz, *Pascal’s Triangle and the Tower of Hanoi*, Amer. Math. Monthly **99** (1992), 538–544. MR1166003 (93f:05004).
- [163] Andreas M. Hinz, *Shortest paths between regular states on the Tower of Hanoi*, Inform. Sci. **63** (1992), 173–181. MR1163725 (93b:05001).
- [164] Andreas M. Hinz, *Square-free Tower of Hanoi sequences*, Enseign. Math. (2) **42** (1996), no. 3-4, 257–264. MR1426439 (98f:05017).
- [165] Andreas M. Hinz, *The Tower of Hanoi*, Algebras and Combinatorics (An International Congress, ICAC ’99, Hong Kong (Kar-Ping Shum, Earl J. Taft, and Zhe-Xian Wan, eds.), Springer-Verlag, Singapore, 1999, pp. 277–289. MR1733183 (2000j:05015).
- [166] Andreas M. Hinz, Sandi Klavžar, Uroš Milutinović, Daniele Parisse, and Ciril Petr, *Metric properties of the Tower of Hanoi graphs and Stern’s diatomic sequence*, European J. Comb. **26** (2005), 693–708.
- [167] Andreas M. Hinz and Daniele Parisse, *On the planarity of Hanoi graphs*, Expo. Math. **20** (2002), no. 3, 263–268. MR1924112 (2003f:05034).

- [168] Andreas M. Hinz and Andreas Schief, *The average distance on the Sierpiński gasket*, *Probab. Theory Relat. Fields* **87** (1990), 129–138. MR1076960 (92b:58129).

Andreas M. Hinz, see also [41].

Yuji Hirayama, see [279] and [280].

- [169] Professor Hoffmann (pseudonym for Angelo John Lewis), *Puzzles old and new*, Frederick Warne, London, 1893, pp. 333–334, 361–364.
- [170] Douglas R. Hofstadter, *Metamagical Themas: Tripping the light recursive in lisp, the language of artificial intelligence*, *Sci. Amer.* **248** (1983), no. 3 (March), 22–33. Reprinted as Chapter 18, *Lisp: Lists and Recursion*, in [172].
- [171] Douglas R. Hofstadter, *Metamagical Themas: In which a discourse on the language Lisp concludes with a gargantuan Italian feast*, *Sci. Amer.* **248** (1983), no. 4 (April), 14–28. Reprinted as Chapter 19, *Lisp: Recursion and Generality* in [172].
- [172] Douglas R. Hofstadter, *Metamagical Themas: Questing for the Essence of Mind and Pattern*, Basic Books, New York, 1985. Contains reprints of [170] and [171].
- John E. Hopcroft, see [4].
- [173] Sherwood Hoyt, *Solve the pagoda puzzle using recursive assembly*, *MICRO* (1982), no. 54, 53–57.
- [174] Wen Jing Hsu, *Two arms are faster than one*, *International Journal of Robotics Research* **13** (1994), no. 4, 364–368.
- [175] Thomas F. Hudson, Jr., *Letter to the editor*, *SIGPLAN Notices* **19** (1984), no. 8 (August), 18–20.
- [176] George E. Humes, Marilyn C. Welsh, Paul Retzlaff, and Nicole Cookson, *Towers of Hanoi and London: Reliability and validity of two executive function tasks*, *Assessment* **4** (1997), 249–257.
- R. Hureau, see [71].
- [177] F. O. Ikpotokin, S. C. Chiemeké, and E. O. Osaghae, *Alternative approach to the optimal solution of tower of Hanoi*, *J. Inst. Math. Comput. Sci.* **15** (2004), 229–244.



- [178] F. O. Ikpotoke, S. C. Chiemeke, and E. O. Osaghae, *Generalized recursive optimal solution for the multi-peg towers of Hanoi*, J. Inst. Math. Comput. Sci. **15** (2004), 297–309.

Katsushi Inoue, see [344].

Richard Johnsonbaugh, see [54].

- [179] P. Jullien, *Trois jeux*, La Mathématique et ses Applications (Paris) (E. Galion, ed.), CEDIC, 1972, pp. 23–43.

- [180] Helmut Jürgensen and Derick Wood, *The multiway trees of Hanoi*, Internat. J. Comput. Math. **14** (1983), 137–153. MR0723554 (84k:68026).

- [181] Tetsu Kaizuka, *On the distance minimizing function of Hanoi-4-Tower*, Bull. Centre Inform. **12** (1991), 61–66.

- [182] Tetsu Kaizuka, *On the steps minimizing function of general Hanoi-m-Tower*, Bull. Centre Inform. **13** (1991), 58–63.

- [183] Tetsu Kaizuka, *On the moment minimizing function of Hanoi-4-Tower*, Bull. Centre Inform. **14** (1992), 61–66.

- [184] Lutz Kämmerer and Lorenz Hempel, *The Towers of Hanoi and pileproblems*, Operations Research Proceedings 1996 (Braunschweig) (Berlin) (Uwe Zimmermann, Ulrich Derigs, Wolfgang Gaul, Rolf H. Möhring, and Karl-Peter Schuster, eds.), Springer, 1997, pp. 84–89.

Abraham Kandel, see [272].

- [185] John Karat, *A model of problem solving with incomplete constraint knowledge*, Cognitive Psychology **14** (1982), no. 4, 538–559.

- [186] Edward Kasner and James Newman, *Pastimes of past and present times*, Mathematics and the Imagination, Simon and Schuster, Inc., New York, 1940, pp. 156–192. Reprinted in Volume Four of *The World of Mathematics*, edited by James R. Newman, Simon and Schuster, Inc., New York, 1956, pp. 2416–2438.

- [187] Mohammad Kaykobad, *Towers of Hanoi with 4 pegs*, J. Bangladesh Acad. Sci. **13** (1989), no. 1, 85–90.

- [188] M[ohammad] Kaykobad, S. T.-U. Rahman, R.-A. Bakhtiar, and A. A. K. Majumdar, *A recursive algorithm for the multi-peg Tower of Hanoi problem*, Internat. J. Comput. Math. **57** (1995), 67–73.

M[ohammad] Kaykobad, see [259].

- [189] Clark Kinnaird (ed.), *Encyclopedia of puzzles and pastimes*, Grosset & Dunlap, New York, 1946, pp. 387–388.
- [190] David Klahr and Mitchell Robinson, *Formal Assessment of Problem-Solving and Planning Processes in Preschool Children*, *Cognitive Psychology* **13** (1981), 113–148.
- [191] Sandi Klavžar and Uroš Milutinović, *Graphs  $S(n, k)$  and a variant of the Tower of Hanoi problem*, *Czech. Math. J.* **47** (1997), no. 122, 95–104. MR1435608 (97k:05061).
- [192] Sandi Klavžar and Uroš Milutinović, *Simple explicit formulas for the Frame-Stewart numbers*, *Ann. Comb.* **6** (2002), no. 2, 157–167. MR1955516 (2003k:05004).
- [193] Sandi Klavžar, Uroš Milutinović, and Ciril Petr, *Combinatorics of topmost discs of multi-peg Tower of Hanoi problem*, *Ars Combin.* **59** (2001), 55–64. MR1832197 (2002b:05013).
- [194] Sandi Klavžar, Uroš Milutinović, and Ciril Petr, *1-Perfect Codes in Sierpiński Graphs*, *Bull. Austral. Math. Soc.* **66** (2002), 369–384.
- [195] Sandi Klavžar, Uroš Milutinović, and Ciril Petr, *On the Frame-Stewart algorithm for the multi-peg Tower of Hanoi problem*, *Discrete Appl. Math.* **120** (2002), no. 1–3, 141–157. MR1912864 (2003c:05028).
- Sandi Klavžar, see [166].
- [196] Carole S. Klein and Steven Minsker, *The super Towers of Hanoi problem: large rings on small rings*, *Discrete Math.* **114** (1993), 283–295. MR1217759 (94e:05032).
- Cargill G. Knott, see [348].
- Donald E. Knuth, see [145].
- [197] Milos Konopasek, *The Towers of Hanoi from a different viewpoint*, *SIGPLAN Notices* **20** (1985), no. 12 (December), 39–46.
- [198] Boris A. Kordemsky (Kordemskii), *The Moscow Puzzles*, Charles Scribner's Sons, New York, 1972, pp. 42, 216. A translation by Albert Parry of the Russian book *Matematicheskaia Smekalka*. Edited by Martin Gardner.
- [199] Richard E. Korf, *Toward a model of representation changes*, *Artificial Intelligence* **14** (1980), 41–78. MR0587851 (81h:68093).

- [200] K. Kotovsky, J. R. Hayes, and H. A. Simon, *Why are some problems hard? evidence from tower of Hanoi*, *Cognitive Psychology* **17** (1985), no. 2, 248–294.
- [201] M. Kraitchik, *La mathématique des jeux, ou Rêcrérations mathématiques*, Stevens Frères, Bruxelles, 1930, pp. 238–240. Second French edition 1953.
- [202] Maurice Kraitchik, *Mathematical Recreations*, W. W. Norton and Company, New York, 1942, pp. 91–93. English Edition, George Allen & Unwin, Ltd, London, 1943. Second edition, Dover Publications, New York, 1953.
- [203] M. S. Krishnamoorthy and Somenath Biswas, *The generalized Towers of Hanoi*, *SIGACT News* **10** (Winter 1979), 49.
- [204] Robert L. Kruse, *Data Structures and Program Design*, Prentice-Hall, Edgewood Cliffs, New Jersey, 1984. Second Edition, 1987
- [205] Kees van der Laan, *Tower of Hanoi, revisited*, *TUGboat* **13** (1992), no. 1, 91–94.
- [206] B[ernard] Lang, *La “Tour de Hanoi” : une application de la récursivité*, *Micro Systemes* (1981), no. 19, 201–203.
- [207] M. F. Lanz and P. Martin, *Les 1-graphes finis et leurs morphismes*, *Math. Sci. Humaines* (13<sup>e</sup> année, 1975), no. 51, 51–75, 89. MR0401485 (53:5312).
- [208] Claude-Marcel Laurent, *Le savoir-s’amuser, Tome II: Jeux d’Intérieur, Femmes d’Aujourd’hui*, 1962, p. 125.
- [209] Ivan Lavall[é]e, *Note sur le problème des Tours de Hanoi*, *Acta Math. Vietnam.* **7** (1982), no. 2, 131–137. MR0762495 (86b:68018).
- [210] Ivan Lavallée, *Note sur le problème des Tours de Hanoi*, *Rev. Roumaine Math. Pures Appl.* **30** (1985), 433–438. MR0802766 (86k:05012).
- [211] Bruce Leban, *A solution to the tower of Hanoi problem using T<sub>E</sub>X*, *TUGboat* **6** (1985), no. 3, 151–154.
- [212] Joseph Leeming, *Fun with puzzles*, J. B. Lippincott, Philadelphia, 1946, p. 79.
- [213] Ernst [L.] Leiss, *Solving the “Towers of Hanoi” on graphs*, *J. Combin. Inform. System Sci.* **8** (1983), no. 1, 81–89.
- [214] Ernst L. Leiss, *On restricted Hanoi problems*, *J. Combin. Inform. System Sci.* **8** (1983), no. 4, 277–285.
- [215] Ernst L. Leiss, *Finite Hanoi problems: how many discs can be handled?*, *Congr. Numer.* **44** (1984), 221–229. (Proceedings of the 15<sup>th</sup> Southeastern Conference of Combinatorics, Graph Theory and Computing.) MR0777543 (87b:05062).

- [216] Leon S. Levy, *Discrete Structures of Computer Science*, John Wiley & Sons, New York, 1980, pp. 9–18, 21–22.
- [217] Leon S. Levy, *Letter to the editor*, SIGPLAN Notices **21** (1986), no. 12 (December), 12–13.
- Leon S. Levy, see also [46] and [47].
- Angelo John Lewis, see [169].
- [218] Chi-Kwong Li and Ingrid Nelson, *Perfect codes on the Towers of Hanoi graph*, Bull. Austral. Math. Soc. **57** (1998), 367–376. MR1623231 (99f:94018).
- [219] Appie van de Liefvoort, *An iterative solution to the four-peg Tower of Hanoi problem*, Proceedings of the 18<sup>th</sup> Annual ACM Computer Science Conference, 1990, pp. 70–75.
- [220] A[ppie] van de Liefvoort, *An iterative algorithm for the Reve’s puzzle*, Comput. J. **35** (1992), no. 1, 91–92.
- [221] Walther Lietzmann, *Lustiges und Merkwürdiges von Zahlen und Formen*, Ferdinand Hirt, Breslau, 1922.
- [222] Norman F. Lindquist, *Solution to problem 1350*, Math. Mag. **64** (1991), 200.
- [223] Andy Liu and Steve Newman, *Problem 1169*, Crux Mathematicorum **12** (1986), no. 7 (September), 179.
- [224] Andy Liu and Steve Newman, *Solution to problem 1169*, Crux Mathematicorum **13** (1987), no. 10 (December), 328–332.
- Nicholas A. Loehr, see [340].
- Antonette Logar, see [144].
- [225] G. de Longchamps, *Variétés*, Journal de Mathématiques Spéciales (2<sup>e</sup> série) **2** (1883), 286–287.
- [226] L. H. Longley-Cook, *New Math Puzzle Book*, Van Nostrand Reinhold, New York, 1974, pp. 29–30, 37.
- Julio López, see [263].
- [227] Sam Loyd, *Cyclopedia of Puzzles*, Morningside Press, New York, 1914, pp. 223, 368.

- [228] Xue-Miao Lu, *Towers of Hanoi graphs*, Internat. J. Comput. Math. **19** (1986), 23–38.
- [229] Xue-Miao Lu, *Towers of Hanoi problem with arbitrary  $k \geq 3$  pegs*, Internat. J. Comput. Math. **24** (1988), 39–54.
- [230] Xue-Miao Lu, *An iterative solution for the 4-peg Towers of Hanoi*, Comput. J. **32** (1989), no. 2, 187–189.
- [231] Xue-Miao Lu, *A loopless approach to the multipeg Towers of Hanoi*, Internat. J. Comput. Math. **33** (1990), 13–29.
- [232] X[ue]-M[iao] Lu and T. S. Dillon, *A note on parallelism for the Towers of Hanoi*, Math. Comput. Modelling **20** (1994), no. 3, 1–6. MR1288492 (95h:68075).
- [233] X[ue]-M[iao] Lu and T. S. Dillon, *Parallelism for mutipeg Towers of Hanoi*, Math. Comput. Modelling **21** (1995), no. 3, 3–17. MR316115 (96c:68078).
- [234] X[ue]-M[iao] Lu and T. S. Dillon, *Nonrecursive solution to parallel multipeg Towers of Hanoi: A decomposition approach*, Math. Comput. Modelling **24** (1996), no. 3, 29–35. MR1404429 (97d:05025).
- [235] Édouard Lucas, *Le calcul et les machines à calculer*, Revue Scientifique (3<sup>e</sup> série) **8** (1884), no. 16 (October 18), 482–496. An abridged version of [236] below.
- [236] Édouard Lucas, *Le calcul et les machines à calculer*, Compte Rendu de la 13<sup>e</sup> Session, Association Française pour l’Avancement des Sciences, 1885, pp. 111–141. An address presented 8 September 1884 at the Congrès de l’Association held in Blois.
- [237] Édouard Lucas, *Nouveaux jeux scientifiques de M. Édouard Lucas*, La Nature, 17<sup>th</sup> year, 2<sup>nd</sup> semester (1889), no. 855 (October 5), 301–303.
- [238] Édouard Lucas, *Récréations Mathématiques*, Gauthier-Villars, Paris, 1893. Reprinted several times by Albert Blanchard, Paris. Contains the material in [236].
- [239] Édouard Lucas, *L’Arithmétique Amusante: Introduction aux Récréations Mathématiques*, Gauthier-Villars, Paris, 1895, pp. 179–183. Reprinted several times by Albert Blanchard, Paris. Contains essentially the same Tower of Hanoi material as [238].
- Édouard Lucas, see also [20], [55], and [56].
- [240] Fabrizio Luccio, *Spunti di algoritmica concreta*, Boll. Un. Mat. Ital. A **6 3** (1984), no. 1, 57–80. MR0739192 (86a:01037).

- [241] George F. Luger, *The use of the state space to record the behavioral effects of subproblems and symmetries in the Tower of Hanoi problem*, Internat. J. Man-Machine Studies **8** (1976), 411–421.
- [242] George F. Luger, *A state-space description of transfer effects in isomorphic problem situations*, Internat. J. Man-Machine Studies **10** (1978), 613–623.
- [243] George F. Luger and Michael Steen, *Using the state space to record the behavioral effects of symmetry in the Tower of Hanoi problem and an isomorph*, Internat. J. Man-Machine Studies **14** (1981), 449–460.
- [244] W. F. Lunnon, *All you ever wanted to know about the Towers of Hanoi but were afraid to ask (on the centenary of the Tower of Bramah)*, Unpublished manuscript., 1982.
- [245] W. F. Lunnon, *The Reve's puzzle*, Comput. J. **29** (1986), 478.
- [246] A. A. K. Majumdar, *On the generalized Tower of Hanoi problem*, J. Bangladesh Acad. Sci. **15** (1991), no. 2, 173–183.
- [247] A. A. K. Majumdar, *A note on the iterative algorithm for the Reve's puzzle*, Comput. J. **37** (1994), no. 5, 463–464.
- [248] A. A. K. Majumdar, *Frame's conjecture and the Tower of Hanoi problem with four pegs*, Indian J. Math. **36** (1994), no. 3, 215–227. MR134572(96d:90112).
- [249] A. A. K. Majumdar, *A note on the iterative algorithm for the four-peg Tower of Hanoi problem*, J. Bangladesh Acad. Sci. **18** (1994), no. 2, 241–250.
- [250] A. A. K. Majumdar, *The generalized four-peg Tower of Hanoi problem*, Optimization **29** (1994), 349–360. MR1278238 (95b:90151).
- [251] A. A. K. Majumdar, *A note on the divide-and-conquer approach to the four-peg tower of Hanoi problem*, J. Math. & Math. Sci. **10** (1995), 1–10.
- [252] A. A. K. Majumdar, *A recursive algorithm for the 4-peg Tower of Hanoi problem*, J. Bangladesh Acad. Sci. **19** (1995), no. 1, 123–126.
- [253] A. A. K. Majumdar, *The generalized p-peg Tower of Hanoi problem*, Optimization **32** (1995), 175–183. MR1314373 (95j:90087).
- [254] A. A. K. Majumdar, *The divide-and-conquer approach to the generalized p-peg Tower of Hanoi problem*, Optimization **34** (1995), 373–378.
- [255] A. A. K. Majumdar, *A note on the bottleneck Reve's puzzle*, Jahangirnagar University Journal of Science **20** (1996), 115–124.

- [256] A. A. K. Majumdar, *Generalized multi-peg Tower of Hanoi problem*, J. Austral. Math. Soc. Ser. B **38** (1996), no. 2, 201–208. MR1414361 (97h:05018).
- [257] A. A. K. Majumdar, *A note on the steps minimizing function of general Hanoi-m-tower*, J. Bangladesh Acad. Sci. **20** (1996), no. 1, 1–7.
- [258] A. A. K. Majumdar and A. Halder, *A recursive algorithm for the bottleneck Reve's puzzle*, Sūrikaiseikikenkyūsho Kōkyūroku (1996), no. 947, 150–161. MR1435538 (98a:90128).
- [259] A. A. K. Majumdar and M. Kaykobad, *An iterative algorithm for the 5-peg Tower of Hanoi problem*, J. Bangladesh Acad. Sci. **20** (1996), no. 2, 119–128.
- [260] Abdulla-Al-Kafi Majumdar, *The bottleneck Tower of Hanoi problem with four pegs*, Proc. Pakistan Acad. Sci. **33** (1996), no. 1-2, 127–128.
- [261] Abdulla-Al-Kafi Majumdar, *A note on the cyclic Towers of Hanoi*, Proc. Pakistan Acad. Sci. **33** (1996), no. 1-2, 131–132.
- [262] Abdullah-Al-Kafi Majumdar, *A note on the generalized multi-peg Tower of Hanoi problem*, Proc. Pakistan Acad. Sci. **33** (1996), no. 1-2, 129–130.
- A. A. K. Majumdar, see also [188], [298], and [299].
- [263] Cristián Mallol, Julio López, and Dany Serrato, *Hanoi Towers: Study of a class of algorithms*, Nova J. Math. Game Theory Algebra **5** (1996), 383–388. MR1455831 (98:90150).
- P. Martin, see [207].
- [264] Stephen B. Maurer and Anthony Ralston, *Discrete algorithmic mathematics*, Addison-Wesley, Reading, MA, 1991.
- [265] Herbert Mayer and Don Perkins, *Towers of Hanoi revisited: A nonrecursive surprise*, SIGPLAN Notices **19** (1984), no. 2 (February), 80–84.
- [266] Stepan Maziar, *Solution of the Tower of Hanoi problem using a binary tree*, SIGPLAN Notices **20** (1985), no. 5 (May), 16–20.
- [267] A. J. McIntosh, *Binary and the Towers of Hanoi*, Math. Teaching (Summer 1972), no. 59, 15.
- L. G. L. T. Meertens, see [25].
- M. Mendès France, see [14].

- [268] Bertrand Meyer, *A note on iterative Hanoi*, SIGPLAN Notices **19** (1984), no. 12 (December), 38–40.
- Uroš Milutinović, see [166], [191], [192], [193], [194], and [195].
- [269] Steven Minsker, *The Towers of Hanoi rainbow problem: Coloring the rings*, J. Algorithms **10** (1989), 1–19. MR0987094 (90i:05012).
- [270] Steven Minsker, *The towers of Antwerpen problem*, Inform. Process. Lett. **38** (1991), 107–111. MR1113343 (92d:68065).
- Steven Minsker, see [196].
- [271] Caesar Mitis, *Rechnerische Scherze*, Otto Maier, Ravensburg, no year, pp. 17–18.
- Toshiya Mogi, see [52].
- Halina Moss, see [75].
- Alexander Moszkowski, see [132].
- [272] Joe L. Mott, Abraham Kandel, and Theodore P. Baker, *Discrete Mathematics for Computer Scientists*, Reston Publishing Co., Reston, Virginia, 1983.
- [273] Sheldon S. Myers, *Applications: An inductive-deductive experiment with the Tower of Hanoi puzzle*, Math. Teacher **44** (1951), no. 7 (November), 505.
- [274] Sheldon S. Myers, *Applications: An application of mathematical induction to the Tower of Hanoi*, Math. Teacher **45** (1952), no. 7 (November), 522–523.
- [275] Robert Neale, *The Temple of Hanoi—an old puzzler with a new twist*, Games **6** (1982), no. 7 (November), 70.
- Ingrid Nelson, see [65], [66], and [218].
- Allen Newell, see [121] and [122].
- James Newman, see [186].
- Steve Newman, see [223] and [224].
- [276] Seizaburo Niizuma, *On the concept of “difference” in the analysis of GPS*, Transactions of the Institute of Electronics and Communication Engineers of Japan, Section E. **E63** (1980), no. 8, 602. (Abstract only. Full letter in volume J63, pages 525–526 in Japanese)



- [277] Hugh Noland, *Problem 1350*, Math. Mag. **63** (1990), 189.
- [278] Eugene P. Northrop, *Riddles in Mathematics—A Book of Paradoxes*, D. Van Nostrand Company, Inc., New York, 1942, pp. 25–27.
- [279] Shigeru Obara and Yuji Hirayama, *The “Red and white Towers of Hanoi” puzzle*, J. Hokkaido Univ. Ed. Sect. II A **46** (1995), no. 1 (August), 61–69.
- [280] Shigeru Obara and Yuji Hirayama, *The “Distribution of the Tower of Hanoi” puzzle*, J. Hokkaido Univ. Ed. Sect. II A **47** (1997), no. 2 (February), 175–179. MR1441984 (97k:00002).
- [281] Anton Ohlert, *Toy*, August 19, 1884, United States Patent Office, Patent No. 303946.
- E. O. Osaghae, see [177] and [178].
- Ivor Page, see [349].
- Daniele Parisse, see [166] and [167].
- Albert Parry, see [198].
- [282] Helmut Partsch and Peter Pepper, *A family of rules for recursion removal*, Inform. Process. Lett. **5** (1976), no. 6 (December), 174–177. MR0443407 (56:1777).
- [283] Henri de Parville, *Revue des Sciences*, Journal des Débats Politiques et Littéraires (December 27, 1883), 1–2.
- [284] Henri de Parville, *Récréations mathématiques: La tour d’Hanoï et la question du Tonkin*, La Nature, 12<sup>th</sup> year, 1<sup>st</sup> semester, no. 565 (March 29, 1884), 285–286. A modified version of item [283] above, with figures.
- Oren Patashnik, see [145].
- [285] Marvin C. Paull, *Algorithm design; a recursion transformation framework*, John Wiley & Sons, Inc., New York, 1988. MR0939368 (90i:68001).
- [286] D. S. Peckett, *Going forth*, Computing Today **4** (1982), no. 2, 91–95.
- [287] Howard A. Peelle, *Towers of Hanoi, simplified in J*, VECTOR **12** (Jan. 1996), no. 3, 27–32.
- [288] Howard A. Peelle, *Towers of Hanoi generalized in J*, VECTOR **15** (Jan. 1999), no. 3, 38–46.
- Peter Pepper, see [282].

- [289] J. I. Perelman, *Mathematik im Spiel*, Der Kinderbuchverlag, Berlin, 1951, pp. 24–27.
- [290] J. I. Perelman, *Heitere Mathematik*, Der Kinderbuchverlag, Berlin, no year, pp. 83–89.
- Don Perkins, see [265].
- Ciril Petr, see [166], [193], [194], and [195].
- [291] Alberto Pettorossi, *Towers of Hanoi problems: Deriving iterative solutions by program transformations*, BIT **25** (1985), 327–334. MR9787093 (86d:68030).
- [292] Alberto Pettorossi, *Transformation strategies for deriving on line programs*, CAAP '86 — Proceedings of the 11th Colloquium on Trees in Algebra and Programming (P. Franchi-Zannettacci, ed.), Lecture Notes in Computer Science, no. 214, Springer Verlag, 1986, pp. 127–141.
- [293] Alberto Pettorossi, *Derivation of efficient programs for computing sequences of actions*, Theoret. Comput. Sci. **53** (1987), 151–167. MR0923330 (91e:68022).
- [294] Jean Piaget, *The Grasp of Consciousness: Action and Concept in the Young Child*, Harvard University Press, Cambridge, Massachusetts, 1976, pp. 287–299. Translation by Susan Wedgwood of 1974 original
- [295] David G. Poole, *Solution to problem 1350*, Math. Mag. **64** (1991), 200–201.
- [296] David [G.] Poole, *The bottleneck Towers of Hanoi problem*, J. Recreational Math. **24** (1992), no. 3, 203–207.
- [297] David G. Poole, *The towers and triangles of Professor Claus (or, Pascal knows Hanoi)*, Math. Mag. **67** (1994), 323–344. MR1307797 (95m:05023).
- S. T.-U. Rahman, see [188].
- Anthony Ralston, see [264].
- Jim Randall, see [10].
- C. Ratzimbazafy, see [71].
- [298] G. C. Ray and A. A. K. Majumdar, *A note on the bottleneck Tower of Hanoi problem*, Chittagong Univ. Stud. Part II Sci. **19** (1995), 27–34.
- [299] G. C. Ray and A. A. K. Majumdar, *A note on the cyclic Tower of Hanoi problem*, Chittagong Univ. Stud. Part II Sci. **19** (1995), 75–81.
- Paul Retzlaff, see [176].

- [300] Trevor Rice, *Mathematical Games and Puzzles*, St. Martin's Press, New York, 1973, pp. 55–56.
- [301] Robert L. Ripley, *The New Believe It or Not Book—2nd Series*, Simon and Schuster, New York, 1931, pp. 72–73.
- [302] Lorenzo Robbiano, *Algebra e computer*, *Atti Accad. Ligure Sci. Lett.* **43** (1986), 75–81. MR0955543 (98i:00010).
- [303] Eric Roberts, *Thinking Recursively*, John Wiley & Sons, Inc., New York, 1986, pp. 63–74.
- Mitchell Robinson, see [190].
- G. C. A. Robson, see [39] and [40].
- Patrick J. Rodriguez, see [340].
- [304] J. S. Rohl, *The Towers of Hanoi problem*, *Comput. J.* **28** (1985), no. 3, 350.
- [305] J. S. Rohl, *Towers of Hanoi: The derivation of some iterative versions*, *Comput. J.* **30** (1987), no. 1, 70–76.
- [306] J. S. Rohl, *The Towers of Hanoi—a representation-free solution*, *SIGPLAN Notices* **22** (1987), no. 3 (March), 126.
- [307] J. S. Rohl and T[homas] D. Gedeon, *Four-tower Hanoi and beyond*, *Austral. Comput. Sci. Comm.* **5** (1983), 156–162. (Proceedings of the 6<sup>th</sup> Australian Computer Conference, Sidney)
- [308] J. S. Rohl and T[homas] D. Gedeon, *The Reve's puzzle*, *Comput. J.* **29** (1986), no. 2, 187–188. *Corrigendum*, **31** (1988), no. 2, 190
- [309] Hamzeh H. Roomany, *Letter to the editor*, *SIGPLAN Notices* **20** (1985), no. 4 (April), 15–16.
- [310] Ted Roth, *The Tower of Brahma revisited*, *J. Recreational Math.* **7** (1974), no. 2 (Spring), 116–119. Reprinted in *Mathematical Solitaires & Games*, Benjamin L. Schwartz, ed., Baywood Publishing Co., Inc., Farmingdale, NY, 1980, pp. 26–29.
- [311] Eric Frank Russell, *Now inhale*, *Astounding Science Fiction* **63** (1959), no. 2 (April), 31–53. Reprinted in *TV: 2000*, edited by Isaac Asimov, Fawcett Crest, 1982. (fiction).

S. V. Safronyuk, see [16].

- [312] A. Sainte-Laguë, *Géométrie de situation et jeux*, Mémorial des Sciences Mathématiques, no. XLI, Gauthier-Villars, Paris, 1929, pp. 39–40.
- [313] André Sainte-Laguë, *Avec des nombres et des lignes (Récréations mathématiques)*, Librairie Vuibert, Paris, 1937, pp. 71–89. Second Edition 1940; Third Edition 1946.
- [314] Amir Sapir, *The Tower of Hanoi with Forbidden Moves*, *Comput. J.* **47** (2004), no. 1, 20–24.
- Amir Sapir, see also [15].
- [315] U. K. Sarkar, *On the design of a constructive algorithm to solve the multi-peg towers of Hanoi problem*, *Theoret. Comput. Sci.* **237** (2000), 407–421. MR1756218 (2001k:05025).
- [316] U. K. Sarkar, *On uniqueness of solution to the multi-peg Towers of Hanoi*, *Internat. J. Comput. Math.* **78** (2001), no. 1, 57–72. MR1893857 (2003a:68105).
- [317] F. Scarioni and H. G. Speranza, *A probabilistic analysis of an error-correcting algorithm for the Towers of Hanoi puzzle*, *Inform. Process. Lett.* **18** (1984), 99–103. MR0757972 (87j:68057).
- [318] F. Scarioni and M. G. Speranza, *The density function of the number of moves to complete the Towers of Hanoi puzzle*, *Ann. Oper. Res.* **1** (1984), 291–303.
- [319] William L. Schaaf, *Number games and other mathematical recreations*, *The New Encyclopædia Britannica*, vol. 25, Encyclopædia Britannica, Inc., Chicago, 15th ed., 1974, pp. 1–13.
- Andreas Schief, see [168].
- [320] P. H. Schoute, *De Ringen van Brahma*, *Eigen Haard* (1884), no. 22 and 23, 274–276 and 286–287.
- [321] Fred. Schuh, *Spelen met Getallen: Een Fascinerend Boek voor Jong en Oud*, W. J. Thieme & Cie, Zutphen, 1951, pp. 89–93.
- [322] Fred. Schuh, *The Master Book of Mathematical Recreations*, Dover Publications, Inc., New York, 1968, pp. 119–121. An English translation by F. Göbel of *Wonderlijke Problemen; Leerzaam Tijdverdrijf Door Puzzle en Spel*, W. J. Thieme & Cie, Zutphen, 1943.
- [323] Allen J. Schwenk, *Solution to problem 1350*, *Math. Mag.* **64** (1991), 202–203.
- [324] R. S. Scorer, P. M. Grundy, and C. A. B. Smith, *Some binary games*, *Math. Gaz.* **28** (1944), no. 280 (July), 96–103.

- [325] Joseph & Lenore Scott, *Pencil pushers — Great puzzles #2*, Ace Books, New York, 1973, pp. 137–138.
- [326] Jiří Sedláček, *Keine Angst vor Mathematik*, VEB Fachbuchverlag, Leipzig, 1965, pp. 19–21.
- [327] Raymond Sérout, *Programming for mathematicians*, Springer-Verlag, Berlin, 2000, pp. 345–348. Translated from the 1995 French original by Donal O’Shea MR1740388 (2001a:68001).
- Dany Serrato, see [263].
- Jeffrey O. Shallit, see [10] and [12].
- Jian Shen, see [53].
- [328] Masamichi Shimura and Frank H. George, *Rule-oriented methods in problem solving*, *Artificial Intelligence* **4** (1973), 203–223. MR0341957 (49:6703).
- [329] Michael Shwarger, *Another look at the Tower of Hanoi*, *Math. Teacher* **70** (1977), no. 6 (September), 528–533.
- Joseph R. Simmons, III., see [340].
- H. A. Simon, see [200].
- [330] Jerry Slocum and Jack Botermans, *Puzzles Old & New—How to Make and Solve Them*, University of Washington Press, Seattle, 1986, p. 135.
- C. A. B. Smith, see [324].
- P. Souphandavong, see [71].
- M. G. Speranza, see [318] and [317].
- [331] Manfred Stadel, *Another nonrecursive algorithm for the Towers of Hanoi*, *SIGPLAN Notices* **19** (1984), no. 9 (September), 34–36.
- [332] Edmund Staples, *The Tower of Hanoi problem with arbitrary start and end positions*, *SIGACT News* **18** (1987), no. 3 (Spring), 61–64.
- Michael Steen, see [243].
- [333] B. M. Stewart, *Advanced problem 3918*, *Amer. Math. Monthly* **46** (1939), 363.
- [334] B. M. Stewart, *Solution to advanced problem 3918*, *Amer. Math. Monthly* **48** (1941), 217–219.

- [335] Ian Stewart, *Visions mathématiques: Le lion, le lama et la laitue*, Pour la Science (August 1989), no. 142, 102–107. English version, *The Lion, the Llama, and the Lettuce*, is Chapter 1 of *Another Fine Math You've Got Me Into . . .*, W. H. Freeman and Company, New York, 1992. MR1179655 (93i:00003).
- [336] Ian Stewart, *Four encounters with Sierpiński's gasket*, Math. Intell. **17** (1995), no. 1 (Winter), 52–64. MR1319993 (96e:58083).
- [337] Ian Stewart, *Mathematical Recreations: Sierpinski's ubiquitous gasket*, Sci. Amer. **281** (1999), no. 2, 90–91.
- [338] Paul K. Stockmeyer, *Variations on the four-post Tower of Hanoi puzzle*, Congr. Numer. **102** (1994), 3–12. (Proceedings of the 25<sup>th</sup> Southeastern International Conference on Combinatorics, Graph Theory and Computing)
- [339] Paul K. Stockmeyer, *The average distance between nodes in the cyclic Tower of Hanoi digraph*, Combinatorics, Graph Theory, and Algorithms (Kalamazoo, Michigan) (Y. Alavi, D. R. Lick, and A. Schwenk, eds.), vol. II, New Issues Press, 1999, pp. 799–808. Proceedings of the Eight Quadrennial International Conference on Graph Theory, Combinatorics, Algorithms, and Applications.
- [340] Paul K. Stockmeyer, C. Douglas Bateman, James W. Clark, Cyrus R. Eyster, Matthew T. Harrison, Nicholas A. Loehr, Patrick J. Rodriguez, and Joseph Simmons III, *Exchanging disks in the Tower of Hanoi*, Internat. J. Comput. Math. **59** (1995), 37–47.
- [341] Roger G. Stone, *Points recurring: The history of a railway problem*, SIGPLAN Notices **17** (1982), no. 9 (September), 88–94.
- [342] Peter Storme and Paul Stryfe, *How to torture your friends*, Simon and Schuster, New York, 1941, pp. 75–76, 149.
- R. Stowasser, see [358].
- P. E. D. Strain-Clark, see [61].
- Paul Stryfe, see [342].
- [343] Mario Szegedy, *In how many steps the  $k$  peg version of the Towers of Hanoi game can be solved?*, STACS 99 (Proceedings of the 16th Annual Symposium on Theoretical Aspects of Computer Science, Trier, 1999) (Berlin) (Christoph Meinel and Sophie Tison, eds.), Lecture Notes in Computer Science, no. 1563, Springer, 1999, pp. 356–361. MR1734064 (2000m:68124).

- [344] Itsuo Takanami and Katsushi Inoue, *A note on algorithms for tower of Hanoi*, Mathematical foundations for computer science (Proceedings of a Symposium held at the Research Institute for Mathematical Sciences, Kyoto University), Kyoto University, Kyoto, Japan, 1978, pp. 218–229. MR0544622 (80f:68003).
- [345] Aaron M. Tenenbaum and Moshe J. Augenstein, *Data Structures Using Pascal*, Prentice-Hall, Englewood Cliffs, New Jersey, 1981, pp. 124–129, 133, 149–154.
- [346] Gaston Tissandier, *Les Récréations Scientifiques, ou l’enseignement par les jeux*, G. Masson, Paris, fifth ed., 1888, pp. 223–228. Sixth ed., 1892; seventh ed., 1894; eighth ed., 1897. Essentially the same as [284]. An English translation can be found in [347].
- [347] Gaston Tissandier, *Half-Hours of Scientific Amusements; or, Practical Physics and Chemistry without Apparatus*, Ward, Lock, & Co., London, 1890, pp. 106–111. An English translation of [346] by Henry Frith.
- [348] Tom Tit (pseudonym for Arthur Good), *Scientific Amusements*, Thomas Nelson and Sons, Ltd., London, 1918, pp. 382–383. Translated from the French and adapted by Cargill G. Knott.
- Jeffrey D. Ullman, see [4].
- [349] Jeyakesavan Veerasamy and Ivor Page, *On the Towers of Hanoi problem with multiple spare pegs*, Internat. J. Comput. Math. **52** (1994), 17–22.
- [350] T[imothy] R. Walsh, *The Towers of Hanoi revisited: Moving the rings by counting the moves*, Inform. Process. Lett. **15** (1982), no. 2, 64–67. MR0675870 (83j:68039).
- [351] T[imothy] R. Walsh, *A case for iteration*, Congr. Numer. **40** (1983), 409–417. (Proceedings of the 14<sup>th</sup> Southeastern Conference on Combinatorics, Graph Theory and Computing.) MR0734387 (85a:68066).
- [352] T[imothy] R. Walsh, *Iteration strikes back—at the cyclic Towers of Hanoi*, Inform. Process. Lett. **16** (1983), 91–93. MR0696846 (84g:68022).
- [353] Timothy R. Walsh, *The generalized Towers of Hanoi for space-deficient computers and forgetful humans*, Math. Intell. **20** (1998), no. 1 (Winter), 32–38.
- [354] Ming Wang, *Two theorems on the Towers of Hanoi problem (chinese)*, Math. Appl. (Wuhan) **12** (1999), no. 2, 112–114.
- [355] X. Wang and Y.-J. Wu, *Dynamic programming algorithm for the generalized towers of Hanoi problem*, Minimicro Systems **26** (2005), 869–872.

- Yu-Kuo Wang, see [364].
- Charles B. Waugh, see [311].
- Marilyn C. Welsh, see [176].
- [356] Richard L. Wexelblat, *Editorial*, SIGPLAN Notices **20** (1985), no. 9 (September), 1.
- [357] Niklaus Wirth, *Algorithms + Data Structures = Programs*, Prentice-Hall, Englewood Cliffs, NJ, 1976, p. 159.
- [358] A. Witzel and R. Stowasser, *Stellenwertsysteme — Einstiegs- Anwendungsprobleme*, MU **23** (1977), no. 1, 88–101.
- [359] Derick Wood, *The Towers of Brahma and Hanoi revisited*, J. Recreational Math. **14** (1981-1982), no. 1, 17–24. MR0629340 (82i:68031).
- [360] D[erick] Wood, *Adjudicating a Towers of Hanoi contest*, Internat. J. Comput. Math. **14** (1983), 199–207. MR0727008 (85b:68019).
- Derick Wood, see also [180].
- [361] W. Hugh Woodin, *The tower of Hanoi*, Truth in Mathematics (H. G. Dales and G. Oliveri, eds.), Oxford Univ. Press, New York, 1998, pp. 329–351. Papers from the conference held in Mussomeli, September 13–20, 1995 MR1688333 (2000j:03008).
- [362] Jer-Shyan Wu and Rong-Jaye Chen, *The Towers of Hanoi problem with parallel moves*, Inform. Process. Lett. **44** (1992), 241–243. MR1202348 (93k:68041).
- [363] Jer-Shyan Wu and Rong-Jaye Chen, *The Towers of Hanoi problem with cyclic parallel moves*, Inform. Process. Lett. **46** (1993), 1–6. MR1216038 (94a:68043).
- [364] Jer-Shyan Wu and Yu-Kuo Wang, *An optimal algorithm to implement the Hanoi towers with parallel moves*, Inform. Process. Lett. **86** (2003), 289–293. MR1978209 (2004c:05022).
- Y.-J. Wu, see [355].
- Chuan Xu, see [365].
- [365] Hai Yang and Chuan Xu, *Preliminary exploration of the 4-peg Hanoi tower (chinese)*, Beijing Daxue Xuebao Ziran Kexue Ban **40** (2004), 99–106. MR2056463 (2005a:05021).



- [366] A. J. van Zanten, *Lineaire Differentievergelijkingen in de Informatica*, CWI Syllabus (Centrum voor Wiskunde en Informatica) **18** (1988), 65–79.
- [367] A. J. van Zanten, *The complexity of an optimal algorithm for the generalized Tower of Hanoi problem*, *Internat. J. Comput. Math.* **36** (1990), 1–8.
- [368] A. J. van Zanten, *An optimal algorithm for the twin-tower problem*, *Delft Progr. Report* **15** (1991), 33–50. MR1103419 (92a:05001).
- [369] A. J. van Zanten, *An iterative optimal algorithm for the generalized Tower of Hanoi problem*, *Internat. J. Comput. Math.* **39** (1991), 163–168.

## Index of Journals Cited

*ABACUS*; Springer; New York, NY; ISSN 0724-6722.

*Acta Inform.* = *Acta Informatica*; Springer; Heidelberg, Germany; ISSN 0001-5903.

*Acta Math. Vietnam.* = *Acta Mathematica Vietnamica*; National Center for Scientific Research; Hanoi, Vietnam; ISSN 0251-4184.

*AI Expert*; Miller Freeman; San Francisco, CA; ISSN 0888-3785.

*Amer. Math. Monthly* = *The American Mathematical Monthly*; Mathematical Association of America; Washington, DC; ISSN 0002-9890.

*Ann. Comb.* = *Annals of Combinatorics*; Birkhäuser; Basel, Switzerland; ISSN 0218-0006.

*Ann. Oper. Res.* = *Annals of Operations Research*; Baltzer Science Publishers; Amsterdam, The Netherlands; ISSN 0254-5330.

*APL Quote Quad*; Association for Computing Machinery; New York, NY; ISSN 0163-6006.

*Ars Combin.* = *Ars Combinatoria*; Charles Babbage Research Centre; Winnipeg, Canada; ISSN 0381-0732.

*Artificial Intelligence*; North-Holland Publishing Co.; Amsterdam, The Netherlands; ISSN 0004-3702.

*Assessment*; Psychological Assessment Resources, Inc.; Odessa, FL; ISSN 1073-1911.

*Astounding Science Fiction*; Street & Smith Publications, Inc.; New York, NY.

*Atti Accad. Ligure Sci. Lett.* = *Atti della Accademia Ligure di Scienze e Lettere*; Genoa, Italy; ISSN 0365-0278.

*Austral. Comput. Sci. Comm.* = *Australian Computer Science Communications*; Queensland Univ. Tech.; Brisbane, Australia; ISSN 0157-3055.

*Austral. Math. Teacher* = *The Australian Mathematics Teacher*; Australian Association of Mathematics Teachers; Adelaide, Australia; ISSN 0045-0685.

*Boll. Un. Mat. Ital. A 6* = *Unione Matematica Italiana. Bollettino. A. Serie VI*; Bologna, Italy.

*BIT*; The BIT Foundation; Copenhagen, Denmark; ISSN 0006-3835.

*Bull. Austral. Math. Soc.* = *Bulletin of the Australian Mathematical Society*; Australian Mathematical Society; Queensland, Australia; ISSN 0004-9727.

*Bull. Centre Inform.* = *Bulletin of the Centre for Informatics*; Waseda University; Tokyo, Japan; ISSN 0911-3622.

*Bull. Inst. Combin. Appl.* = *Bulletin of the Institute of Combinatorics and its Applications*; Inst. Combin. Appl.; Winnipeg, Canada; ISSN 1183-1278.

*Chittagong Univ. Stud. Part II Sci.* = *Chittagong University studies Part II: Science*; University of Chittagong; Chittagong, Bangladesh; ISSN 0253-5459.

*Cognitive Psychology*; Academic Press, Inc.; New York NY; ISSN 0010-0285.

*Comput. J.* = *The Computer Journal*; British Computer Society; ISSN 0010-4620.

*Computer Language*; Computer Language Publishing, Ltd.; San Francisco, CA; ISSN 0749-2839.

*Computing*; Springer; Vienna, Austria; ISSN 0010-485X.

*Congr. Numer.* = *Congressus Numerantium*; Utilitas Mathematica; Winnipeg, Manitoba, Canada; ISSN 0316-1382.

*Crux Mathematicorum*; Canadian Mathematical Society; Ottawa, Ontario, Canada; ISSN 0705-0348.

*Czech. Math. J.* = *Czechoslovak Mathematical Journal*; Academia; Prague, Czech Republic; ISSN 0011-4642.

*Delft Progr. Report* = *Delft Progress Report*; Delft University Press; Delft, The Netherlands; ISSN 0304-985X.

*Discrete Appl. Math.* = *Discrete Applied Mathematics*; Elsevier; Amsterdam, The Netherlands; ISSN 0166-218X.

*Discrete Math.* = *Discrete Mathematics*; Elsevier (North-Holland); Amsterdam, The Netherlands; ISSN 0012-365X.

*Egypt. Comput. J.* = *The Egyptian Computer Journal*; Institute of Statistical Studies and Research; Cairo, Egypt; ISSN 0377-7154.

*Engineering Applications of AI* = *Engineering Applications of Artificial Intelligence*; Pergamon Press Ltd.; Exeter, England; ISSN 0952-1976.

*Enseign. Math.* = *L'Enseignement Mathématique: Revue Internationale, IIe Série*; Commission Internationale de l'Enseignement Mathématique; Geneva, Switzerland; ISSN 0013-8584.

*European J. Combin.* = *European Journal of Combinatorics*; Elsevier; Amsterdam, The Netherlands; ISSN 0195-6698.

*Expo. Math.* = *Expositiones Mathematicae*; Elsevier; Jena, Germany; ISSN 0723-0869.

*Games*; Playboy Enterprises; Chicago, IL; ISSN 0199-9788.

*IEEE Trans. Ed.* = *IEEE Transactions on Education*; Institute of Electrical and Electronics Engineers; New York, NY; ISSN 0018-9359.

*IEEE Trans. Soft. Engin.* = *IEEE Transactions on Software Engineering*; Institute of Electrical and Electronics Engineers; New York, NY; ISSN 0098-5589.

*Indian J. Math.* = *Indian Journal of Mathematics*; Allahabad Mathematical Society; Allahabad, India; ISSN 0019-5324.

*Inform. Process. Lett.* = *Information Processing Letters*; Elsevier (North-Holland); Amsterdam, The Netherlands; ISSN 0020-0190.

*Inform. Sci.* = *Information Sciences; an international journal*; Elsevier; New York, NY; ISSN 0020-0255.

*Internat. J. Comput. Inform. Sci.* = *International Journal of Computer and Information Sciences*; Plenum Press; New York, NY; ISSN 0091-7036.

*Internat. J. Comput. Math.* = *International Journal of Computer Mathematics*; Gordon & Breach; ISSN 0020-7160.

*Internat. J. Man-Machine Studies* = *International Journal of Man-Machine Studies*; Academic Press; London, England; ISSN 0020-7373.

*Internat. J. Math. Ed. Sci. Tech.* = *International Journal of Mathematical Education in Science and Technology*; Taylor & Francis; England; ISSN 0020-739X.

*Izv. Nats. Akad. Nauk Respub. Kazakhstan Ser. Fiz.=Mat.* = *Natsionalnaya Akademiya Nauk Respubliki Kazakhstan. Izvestiya. Seriya Fiziko-Matematicheskaya*; Almaty, Kazakhstan; ISSN 0002-3191.

*J. ACM* = *Journal of the ACM*; Association for Computing Machinery; New York, NY; ISSN 0004-5411.

*J. Algorithms* = *Journal of Algorithms*; Academic Press; Orlando, FL; ISSN 0196-6774.

*J. Austral. Math. Soc. Ser. B* = *Journal of the Australian Mathematical Society, Series B—Applied Mathematics*; Australian Mathematical Society; Canberra, Australia; ISSN 0334-2700.

*J. Bangladesh Acad. Sci. = Journal of Bangladesh Academy of Sciences*; Bangladesh Academy of Sciences; Dhaka, Bangladesh; ISSN 0378-8121.

*J. Combin. Inform. System Sci. = Journal of Combinatorics, Information & System Sciences*; Forum for Interdisciplinary Mathematics; New Delhi, India; ISSN 0250-9628.

*J. Comput. System Sci. = Journal of Computer and System Sciences*; Academic Press; Orlando, FL; ISSN 0022-0000.

*J. Hokkaido Univ. Ed. Sect. II A = Journal of Hokkaido University of Education, Section II A*; Hokkaido University of Education; Sapporo, Japan; ISSN 0367-5939.

*J. Inform. Optim. Sci. = Journal of Information & Optimization Sciences*; Analytic Publishing; Delhi, India; ISSN 0252-2667.

*J. Inform. Process. = Journal of Information Processing*; Information Processing Society of Japan; Tokyo, Japan; ISSN 0387-6101.

*J. Inst. Math. Comput. Sci. Comput. Sci. Ser. ; Journal of the Institute of Mathematics & Computer Sciences (Computer Science Series)*; Inst. Math. Comut. Sci.; Calcutta, India.

*J. Recreational Math. = Journal of Recreational Mathematics*; Baywood Publishing; Amityville, NY; ISSN 0022-412x.

*London Mag. = The London Magazine (Harmsworth London Magazine)*; Harmsworth Brothers Limited; London, England.

*Math. Appl. = Mathematica Applicata*; China Int. Book Trading Corp.; Beijing, China; ISSN 1001-9847.

*Math. Comput. Modelling = Mathematical and Computer Modelling*; Pergamon (Elsevier); Oxford, England; ISSN 0895-7177.

*Math. Gaz. = The Mathematical Gazette*; The Mathematical Association; London, England; ISSN 0025-5572.

*Math. Intell. = The Mathematical Intelligencer*; Springer; New York, NY; ISSN 0343-6993.

*Math. Reviews = Mathematical Reviews*; American Mathematical Society; Providence, RI; ISSN 0025-5629.

*Math. in School = Mathematics in School*; The Mathematical Association; London, England; ISSN 0305-7259.

*Math. Mag. = Mathematics Magazine*; Mathematical Association of America; Washington, DC; ISSN 0025-570X.

*Math. Teacher = The Mathematics Teacher*; National Council of Teachers of Mathematics; Reston, VA; ISSN 0025-5769.

*Math. Teaching = Mathematics Teaching*; Association of Teachers of Mathematics; Nelson, Lancashire, England; ISSN 0025-5785.

*MNU = Der Mathematische und Naturwissenschaftliche Unterricht*; Ferd. Dümmlers; Bonn, Germany; ISSN 0025-5866.

*MU = Der Mathematik-Unterricht*; E. Klett; Stuttgart, Germany; ISSN 0025-5807.

*Math. Sci. Humaines = Mathématiques et Sciences Humaines*; École Hautes Études Sci. Soc.; Paris, France; ISSN 0025-5815.

*Mesures - régulation - automatisme*; Paris, France; ISSN 0026-0193.

*MICRO = MICRO - The 6502/6809 Journal*; MICRO INK; Chelmsford, MA; ISSN 0271-9002.

*MICRO-SYSTEMES*; Société Parisienne d'Édition; Paris, France; ISSN 0183-5084.

*Nova J. Math. Game Theory Algebra = Nova Journal of Mathematics, Game Theory, and Algebra*; Nova Science Publishers, Inc.; New York, NY; ISSN 1060-9881.

*Optimization*; Gordon & Breach; ISSN 0233-1934.

*Pour la Science*; Société pour la Science; Paris, France; ISSN 0153-4092.

*Probab. Theory Relat. Fields = Probability Theory and Related Fields*; Springer; Berlin, Germany; ISSN 0178-8051.

*Proc. Pakistan Acad. Sci. = Proceedings of the Pakistan Academy of Sciences*; Pakistan Academy of Sciences; Islamabad, Pakistan; ISSN 0377-2969.

*Program. Comput. Software = Programming and Computer Software* (A translation of significant articles from *Programmirovanie*; Consultants Bureau; New York, NY; ISSN 0361-7688.

*Programmirovanie*; Akademiya Nauk SSSR; Moscow, USSR; ISSN 0132-3474.

*Quantum*; Springer; New York, NY; [National Science Teachers Association; Washington, DC]; ISSN 1048-8820.

*RAIRO Inform. Théor. Appl. = RAIRO Informatique Théorique et Applications/Theoretical Informatics and Applications*; Paris, France; ISSN 0988-3754; 0296-1598.

*Rev. Roumaine Math. Pures Appl. = Revue Roumaine de Mathématiques Pures et Appliquées*; Académie de la République Roumaine; Bucharest, Romania; ISSN 0035-3965.

*Sci. Amer. = Scientific American*; Scientific American Incorporated; New York, NY; ISSN 0036-8733.

*SIAM J. Comput. = SIAM Journal on Computing*; Society for Industrial and Applied Mathematics; Philadelphia, PA; ISSN 1095-7111.

*SIGACT News*; Association for Computing Machinery; New York, NY; ISSN 0163-5700.

*SIGCSE Bull.* = *SIGCSE Bulletin*; Association for Computing Machinery; New York, NY; ISSN 0097-8418.

*SIGPLAN Notices* = *ACM SIGPLAN Notices*; Association for Computing Machinery; New York, NY; ISSN 0362-1340.

*Systems and Computers in Japan*; Scripta Technica, Inc.; New York, NY; ISSN 0882-1666.

*Sūrikaisekikenkyūsho Kōkyūroku*; Kyoto University; Kyoto, Japan;

*Theoret. Comput. Sci.* = *Theoretical Computer Science*; Elsevier (North-Holland); Amsterdam, The Netherlands; ISSN 0304-3975.

*TUGboat*; TeX Users Group; Portland, OR; ISSN 0896-3207.

*VECTOR*; British APL Association, The British Computing Society; Wiltshire, United Kingdom.

*Z. Oper. Res. Ser. A* = *Zeitschrift für Operations Research, Serie A*; Physica; Heidelberg, Germany; ISSN 0340-9422.

Tower of Hanoi is actually a puzzle game widely popularized by French mathematician Édouard Lucas in year of 1883. See pic 1 It can be also known by other names such as Tower of Brahma or The Lucas Tower. The origin of history is often disputed but most of the oral history mentions of Brahmin monks who are given a divine order from God to move 64 discs from smallest on top to largest of bottom to move through 3 towers guarding a Vietnamese temple. If they managed to complete the puzzles, the world