

List of publications / Julkaisuluettelo

November 10, 2020

Professor Vesa Halava

The 10 most important articles in **bold**.

A Peer-reviewed scientific articles

- [1] V. Halava, T. Harju, L. Ilie, *On a geometric problem of zigzags*, Inform. Process. Lett. **62** (1997) 1-4.
- [2] V. Halava, M. Hirvensalo, R. de Wolf, *Decidability and Undecidability of Marked PCP*, STACS'99 (C. Meinel and S. Tison, eds.), Lecture Notes in Comput. Sci., vol 1563, Springer-Verlag, 1999, pp. 207-206.
- [3] V. Halava, T. Harju, *Undecidability in Integer Weighted Finite Automata*, Fund. Inf. **34** (1999) 189-200.
- [4] V. Halava, T. Harju, *Undecidability of the Equivalence of Finite Substitutions on Regular Language*, RAIRO Theoret. Informatics Appl. **33** (1999) 117-124.
- [5] V. Halava, T. Harju, M. Hirvensalo, *Generalized PCP is Decidable for Marked Morphisms*, FCT'99 Fundamentals of Computation Theory (G. Ciobanu and G. Păun, eds), Lecture Notes in Comput. Sci., vol 1684, Springer, 1999, pp. 304-315.
- [6] V. Halava, T. Harju, *Languages Accepted by Integer Weighted Finite Automata*, (J. Karhumäki, H. Maurer, G. Păun and G. Rozenberg, eds.), *Jewels are forever*, Springer, 1999 pp. 123-134.
- [7] V. Halava, T. Harju, L. Ilie, *Periods and Binary Words*, J. Combin. Theory, Ser. A, **89**, 298-303 (2000).
- [8] V. Halava, T. Harju, M. Hirvensalo, *Generalized Post Correspondence Problem for Marked Morphisms*, Int. J. of Alg. and Comput. Vol. **10** No. 6 (2000), 757-772.
- [9] V. Halava, T. Harju, *Some New Results on Post Correspondence Problem and Its Modifications*, Bulletin of EATCS **73** (2001), 131-141.
- [10] V. Halava, M. Hirvensalo, R. de Wolf, *Marked PCP is decidable*, Theor. Comput. Sci. **255** (2001), 193-204.
- [11] V. Halava, T. Harju, *Mortality in Matrix Semigroups*, American Mathematical Monthly, Vol 108 No. 7, (2001), 649-653.
- [12] V. Halava, T. Harju, *An Undecidability Result Concerning Periodic Morphisms*, DLT'2001, Lecture Note in Comput. Sci., vol. 2295 (2001), pp. 304-310.
- [13] **V. Halava, T. Harju, M. Hirvensalo, *Binary (Generalized) Post Correspondence Problem*, Theor. Comput. Sci. **276** 1-2 (2002), 183-204.**
- [14] V. Halava, T. Harju, *Infinite solutions of marked Post Correspondence Problem*, Formal and Natural Computing (W. Brauer, H. Ehrig, J. Karhumäki and A. Salomaa, eds.), Lecture Notes in Comput. Sci. 2300 (2002), 57-68.

- [15] V. Halava, T. Harju, J. Karhumäki, *Decidability of Binary Infinite Post Correspondence Problem*, Discrete Applied Mathematics, **130** (2003), 521–526.
- [16] V. Halava, T. Harju, H.J. Hoogeboom, M. Latteux, *Languages defined by generalized equality sets*, FCT'2003, Lecture Note in Comput. Sci., vol. 2751 (2003), pp. 355–363.
- [17] V. Halava, *Decidability in Infinite Post Correspondence Problem*, Proceedings of the WORDS'03, TUCS General Publications 27, 2003, 382-391. ISBN 952-12-1211-X .
- [18] V. Halava, T. Harju, *Undecidability in Matrices over Laurent Polynomials*, Adv. in Appl. Math., Vol. 33, Issue 4 (2004), 747-752.
- [19] V. Halava, T. Harju, H.J. Hoogeboom, M. Latteux, *Valence Languages Generated by Equality Sets*, J. Autom. Lang. Comb. **9** 4 (2004), 399-406.
- [20] V. Halava, T. Harju, *Post Correspondence Problem – Recent Results*, Current trends in Theoretical Computer Science, vol. 2 (G. Păun, G. Rozenberg, A. Salomaa, eds.), pp. 511-532, World Scientific, 2004.
- [21] V. Halava, *Integer Weighted Finite Automata, Matrices and Formal Power Series over Laurent Polynomials*, (J. Karhumäki, H. Maurer, G. Păun and G. Rozenberg, eds.), *Theory is Forever*, Springer, 2004 pp. 81-88.
- [22] V. Halava, T. Harju, M. Latteux, *Equality Sets of Prefix Morphisms and Regular Star Languages*, Inform. Process. Lett. 94 (2005), 151-154.
- [23] V. Halava, T. Harju, M. Latteux, *Representation of Regular Languages by Equality Sets*, Bulletin of EATCS **86** (2005), 224-228.
- [24] V. Halava, *Ratkeavuuden ja ratkeamattomuuden välinen raja ja Postin vastaavuusongelma*, Tietojenkäsittelytiede, 21, (2004), 8-18 (in Finnish).
- [25] V. Halava, T. Harju, H.J. Hoogeboom, M. Latteux, *Equality Sets for Recursively Enumerable Languages*, Theor. Inform. Appl. Vol. **39** No. 4 (2005), 661-676.
- [26] V. Halava, T. Harju, J. Karhumäki, M. Latteux, *Post Correspondence Problem for morphisms with unique blocks*, In (S. Brlek, C. Reutenauer, eds) Words 2005, Publication du LaCIM **36** (2005), 265-275.
- [27] V. Halava, T. Harju, M. Hirvensalo, *Positivity of Second Order Linear Recurrent Sequences*, Discrete Applied Mathematics **154** (2006), 447-451.
- [28] V. Halava, T. Harju, J. Karhumäki, *Undecidability in ω -Regular Languages*, Fund. Inf. **73** No. 1-2 (2006), 119-125.
- [29] V. Halava, T. Harju, *Undecidability of Infinite Post Correspondence Problem for Instances of Size 9*, Theor. Inform. Appl. Vol. **40**, No. 4, (2006), 551-558.
- [30] V. Halava, T. Harju, J. Karhumäki, *Structure of Infinite Solutions of Marked and Binary Post Correspondence Problems*, Theory Comput. Syst. Vol. **40**, No. 1, (2007), 43-54.
- [31] V. Halava, T. Harju, J. Karhumäki, M. Latteux, *Extension of the decidability of the marked PCP to instances with unique blocks*, Theor. Comput. Sci. **380**, Issue 3 (2007), 355-362.

- [32] V. Halava, T. Harju, M. Hirvensalo, *Undecidability Bounds for Integer Matrices using Claus Instances*, *Internat. J. Found. Comput. Sci.* Vol. 18, No. 5 (2007), 931-948.
- [33] V. Halava, M. Hirvensalo, *Improved Matrix Pair Undecidability Results*, *Acta Informatica* 44 (2007), 191-205.
- [34] V. Halava, T. Harju, T. Kärki, *Relational codes of words*, *Theor. Comput. Sci.* Vol. 389(1-2)(2007), 237-249.
- [35] V. Halava, T. Harju, *On Markov's Undecidability Theorem for Integer Matrices*, *Semigroup Forum* Vol.75(1)(2007), 173-180.
- [36] V. Halava, T. Harju, T. Kärki, L. Q. Zamboni, *Relational Fine and Wilf Words*, In P. Arnoux, N. Bedaride, and J. Cassaigne,(eds.), *Proceedings of the WORDS 2007*, 159–167, 2007.
- [37] V. Halava, T. Harju, T. Kärki, *Defect Theorems with Compatibility Relation*, *Semigroup Forum* Vol. 76(1) (2008), 1-24.
- [38] V. Halava, T. Harju, T. Kärki, *Interaction Properties of Relational Periods*, *Discrete mathematics & Theoretical Computer Science*, Vol. 10(1) (2008), 87-112.
- [39] V. Halava, T. Harju, M. Hirvensalo, J. Karhumäki, *Post Correspondence Problem for short words*, *Inform. Process. Lett.* 108 (2008), 115-118.
- [40] P. Bell, V. Halava, T. Harju, J. Karhumäki, I. Potapov, *Matrix Equations and Hilbert's Tenth Problem*, *Int. J. of Alg. and Comput.* Vol. 18, No. 8 (2008), 1231-1241.
- [41] V. Halava, T. Harju and T. Kärki, *Square free partial words*, *Inform. Process. Lett.* Vol. 108(5) (2008), 290-292.
- [42] V. Halava, T. Harju, T. Kärki and P. Séébold *Overlap-freeness in infinite partial words*, *Theor. Comput. Sci.*, 410 (8) (2009), 943-948.
- [43] V. Halava, T. Harju, T. Kärki, *The Theorem of Fine and Wilf for Relational Periods*, *Theoret. Inf. Applic. (RAIRO)* 43 (2), (2009), 209-220.
- [44] V. Halava, J. Kari, Yu. V. Matiyasevich, *On Post Correspondence Problem for letter monotonic languages*, *Theor. Comput. Sci.* 410 (30-32), (2009), 2957-2960.
- [45] V. Halava, T. Harju, T. Kärki, *On the Number of Squares in Partial Words*, *RAIRO-Theor. Inf. Appl.* Vol. 44(1), 2010, 125 - 138.
- [46] V. Halava, T. Harju, Tomi Kärki, Michel Rigo, *On the Periodicity of Morphic Words*, In *Developments in Language Theory 2010*, *Lecture Notes in Comput. Sci.* Vol. 6224/2010, 209-217.
- [47] P. Bell, V. Halava, M. Hirvensalo, *On the Joint Spectral Radius for Bounded Matrix Languages*, *The 4th Workshop on Reachability Problems 2010*, *Lecture Notes in Comput. Sci.* Vol. 6227/2010, 91-103.
- [48] V. Halava, Š. Holub, *Reduction Tree of the Binary Generalized Post Correspondence Problem*, *Internat. J. Found. Comput. Sci.* Vol. 22, No. 2 (2011) 473490.

- [49] V. Halava, T. Harju, T. Kärki, *A new proof for the decidability of DOL ultimate periodicity* WORDS 2011, EPTCS **63**, 147–151, 2011.
- [50] P. Bell, V. Halava, M. Hirvensalo, *Decision Problems for Probabilistic Finite Automata on Bounded Languages*, Fund. Inform. **123** no. 1, 1-14, 2013.
- [51] V. Halava, *Deterministic Semi-Thue Systems and Variants of Post Correspondence Problem.*, In (J. Karhumäki, A. Lepistö, L. Q. Zamboni, eds) WORDS 2013, Lecture Notes in Comput. Sci. Vol. 8079, 4–13, 2013.
- [52] V. Halava, T. Harju, *New proof for the undecidability of the circular PCP*, Acta Inf. **50** (5-6): 331–341, 2013.
- [53] **V. Halava and T. Harju, *Word Problem for Deterministic and Reversible Semi-Thue Systems*, Semigroup Forum Vol 88(2), 468–478, 2014.**
- [54] V. Halava, R. Niskanen, I. Potapov, *On Robot Games of Degree Two*, Proceedings of LATA 2015, Adrian Horia Dediu, Enrico Formenti, Carlos Martin-Vide, Bianca Truthe (eds.) Lecture Notes in Comput. Sci. 8977, 224–236, Springer 2015.
- [55] V. Halava, T. Harju, R. Niskanen, I. Potapov, *Weighted Automata on Infinite Words in the Context of Attacker-Defender Games*, Arnold Beckmann, Victor Mitrana, Mariya Ivanova Soskova (eds.): Proceedings of CiE 2015 Lecture Notes in Comput. Sci. 9136, 206–215, Springer 2015.
- [56] **M. Ernvall, V. Halava, T. Harju, , *On n -permutation Post Correspondence Problem*, Theor. Comput. Sci. **601** 15–20, 2015.**
- [57] V. Halava, T. Harju and T. Kärki, *Similarity relations on words*, In V. Berthé, M. Rigo (eds.), Combinatorics, Words and Symbolic Dynamics, pp.175–212, Cambridge University Press, 2016 (ISBN 978-1-107-07702-7).
- [58] **V. Halava, T. Harju, R. Niskanen, I. Potapov, *Weighted automata on infinite words in the context of Attacker-Defender games*, Inf. Comput. **255**, 27–44, 2017.**
- [59] **V. Halava, Yu.V. Matiyasevich, R. Niskanen, *Small Semi-Thue System Universal with Respect to the Termination Problem*, Fundam. Inform. **154**(1-4), 177–184, 2017. [A**
- [60] **V. Halava, T. Harju, E. Sahla, *A New Proof for Undecidability of the Bi-Infinite Post Correspondence Problem*, Fundam. Inform. **154**(1-4), 167–176, 2017.**
- [61] V. Halava, T. Harju, *Walks on Borders of Polygons*, Theor. Comput. Sci. **701**, 120–124, 2017.
- [62] V. Halava, T. Harju, E. Sahla, *On fixed points of rational transductions*, Theor. Comput. Sci. **732**, 85–88, 2018.
- [63] V. Halava, T. Harju, E. Sahla, *On Shuffling a Word with its Letter-to-Letter Substitution*, Fundam. Informaticae **175**(1-4), 201–206, 2020.
- [64] V. Halava, T. Harju, *On the Steps of Emil Post: from Normal Systems to the Correspondence Decision Problem*, Acta Cybernetika, DOI:<https://doi.org/10.14232/actacyb.284625> .

- [65] V. Halava, J. Almog, *The two-edged magic sword of Completeness? The Ideal, the made-up models and a dose of reality*, Synthese, to appear.
- [66] A. Stamenković, S. Stanimirović, V. Halava, *Certain linear and weakly linear systems of matrix equations over semirings. Applications in a state reduction of weighted automata*, Filomat, to appear.

B Non-refereed scientific articles

- [67] **Halava V., Harju T., Pirttimäki T., Compactness and Elementary Proof of Woodin's Theorem, submitted. Preliminary version as TUCS Technical Report 1212.** https://tucs.fi/publications/view/?pub_id=tHaHaPi20a
- [68] Halava V., Pirttimäki T., A survey of Kolmogorov quotients, submitted. Preliminary version as TUCS Technical Report 1211. https://tucs.fi/publications/view/?pub_id=tHaPi20a
- [69] J. Almog, V. Halava, G. Sandu, *The limits of proof vs. the limits of understanding: Proof/Computation vs. Truth, and the quest for completeness*, Synthese, to appear.
- [70] J. Almog, V. Halava, *Turing completeness, FOL completeness and definability*, Abstract of Informal presentation in Computability in Europe (CiE) 2017, June 12-16 2017, Turku.
- [71] V. Halava, *Proofs of Undecidability*, Abstracts of Invited Talks, Igor Potapov (ed.): Proceedings of DLT 2015, Lecture Notes in Comput. Sci, 9168, Springer 2015.
- [72] V. Halava, *Another proof of undecidability for the correspondence decision problem - Had I been Emil Post*, <http://arxiv.org/abs/1411.5197> , 2014.
- [73] J. Cassaigne, V. Halava, T. Harju, F. Nicolas *Tighter Undecidability Bounds for Matrix Mortality, Zero-in-the-Corner Problems, and More*, <http://arxiv.org/abs/1404.0644> (submitted), 2014.
- [74] V. Halava, T. Harju, R. Niskanen, I. Potapov, *Undecidability of the Universality Problem for 3-State Integer Weighted Büchi Automata*, TUCS Technical Reports No 1105, TUCS, 2014.
- [75] **V. Halava, T. Harju, M. Hirvensalo, J. Karhumäki, Skolem's Problem - On the Boundary between Decidability and Undecidability, TUCS Technical Report No. 683, 2005.**
- [76] V. Halava, Š. Holub, *Binary (generalized) Post Correspondence Problem is in P*, TUCS Technical Report No. 785, 2006.
- [77] V. Halava, T. Harju and T. Kärki, *On the number of squares in partial words*, Extended abstract in Journées Montoises on Theoretical Computer Science (Mons) 2008. <http://www.jmit.ulg.ac.be/jm2008/> (also as TUCS Technical Report No. 896, 2009).
- [78] V. Halava, *On Marked Post Correspondence Problem*, Proceedings of the Seventh Nordic Combinatorial Conference (1999), 23-30, ISBN 952-12-0460-5.
- [79] V. Halava, T. Harju, M. Hirvensalo, J. Karhumäki, *(G)PCP for words of length two; answer to an exercise*, Journées Montoises on Theoretical Computer Science (Montpellier) 2002.

- [80] V. Halava, Š. Holub, *Binary generalized Post correspondence problem is decidable in polynomial time*, Extended abstract in Journées Montoises on Theoretical Computer Science (Montpellier) 2002. <http://www.lirmm.fr/jm2002> .
- [81] V. Halava, *Ratkeavuus vs. ratkeamattomuus Postin vastaavuusongelmassa*, Invited talk in Tietojenkäsittelytieteen päivät (Otaniemi, TKK), 2003. (in Finnish).
- [82] V. Halava, T. Harju, J. Karhumäki, *Characterization of Infinite Solutions of Marked Post Correspondence Problems*, in Proceedings of the Workshop on Word Avoidability, Complexity and Morphisms , LaRIA Technical report 2004-07, pp. 43–48.

C Scientific books

- [83] *Proceedings of the Satellite Workshops of DLT 2007*, (Eds. Hirvensalo, Mika and Halava, Vesa and Potapov, Igor and Kari, Jarkko), TUCS General Publication 45. ISBN: 978-952-12-1921-4. (Part 2: *Workshop on Reachability Problems*, Vesa Halava and Igor Potapov, eds.)
- [84] *Special Issue - Reachability Problems 2007 (RP2007)*, (Guest Editors; Halava, Vesa and Potapov, Igor), in International Journal of Foundations of Computer Science (IJFCS) Vol. 19(4), Part 2, (2008).
- [85] *Proceedings of the Second Workshop on Reachability Problems in Computational Models (RP2008)*, Liverpool, UK 15-17 September 2008, (Eds. Halava, Vesa and Potapov, Igor), Electronic Notes in Theoretical Computer Science (ENTCS), Volume 223, Pages 1-264 (26 December 2008) (<http://www.sciencedirect.com/science/journal/15710661>).
- [86] *Special Issue - Reachability Problems 2008 (RP2008)*, (Guest Editors; Halava, Vesa and Potapov, Igor), in International Journal of Foundations of Computer Science (IJFCS) Vol. 20(5), (2009).
- [87] *Words, Graphs, Automata, and Languages; Special Issue Honoring the 60th Birthday of Professor Tero Harju*, Vesa Halava, Juhani Karhumäki, Dirk Nowotka, Grzegorz Rozenberg, eds.: Fundam. Inform. 116, 2012.
- [88] *RuFiDiM II, Proceedings of the Second Russian Finnish Symposium on Discrete Mathematics*, Turku September 2012, Vesa Halava, Juhani Karhumäki, Yuri Matiyasevich (Eds.), TUCS Lecture Notes 17, 2012.
- [89] *Special Issue - RuFiDiM II, the Second Russian Finnish Symposium on Discrete Mathematics*, Vesa Halava, Juhani Karhumäki, Yuri Matiyasevich (Eds.), Fundam. Inform. 132(1), 2014.
- [90] *Special Issue - RuFiDiM IV, the Fourth Russian Finnish Symposium on Discrete Mathematics*, Vesa Halava, Juhani Karhumäki, Yuri Matiyasevich, Mikhail Volkov (Eds.), Fundam. Inform. 162(2-3), 2018.

G Theses

- [91] V. Halava, *The Post Correspondence Problem for Marked Morphisms*, Ph.D. Thesis, University of Turku, TUCS Dissertations 37, 2002. ISBN 951-29-2263-0.

- [92] V. Halava, *Finite Substitutions and Integer Weighted Finite Automata*, Licentiate Thesis, Department of Mathematics, University of Turku, September 1998. (also as TUCS Technical Report No. 197, 1998).
- [93] V. Halava, *Decidable and Undecidable Problems in Matrix Theory*, Masters Thesis, University of Turku, 1997. (also as TUCS Technical Report No. 127, 1997)