

Doppler Institute

for Mathematical Physics and Applied Mathematics

2011 List of Publications

(a) Edited volume

1. P. Exner, ed.: *Mathematical Results in Quantum Physics*, Proceedings of the QMath11 conference held in Hradec Králové, September 6–10, 2010; xi+274 p.; World Scientific, Singapore 2011.

(b) Research papers in journals

(b1) Accepted and published in 2011

1. Petr Ambrož, Anna Frid, Zuzana Masáková, Edita Pelantová: On the number of factors in codings of three interval exchange, *Discr. Math. Theor. Comp. Sci.* **13** (2011), 51–66
2. Joachim Asch, Tomáš Kalvoda, Pavel Štovíček: Resonant cyclotron acceleration of particles by a time periodic singular flux tube, *SIAM J. Appl. Math.* **71** (2011), 829–853
3. Ľubomíra Balková, Karel Břinda, Ondřej Turek: Abelian complexity of infinite words associated with quadratic Parry numbers, *Theor. Comp. Sci.* **412** (2011), 6252–6260
4. Ľubomíra Balková, Edita Pelantová, Štěpán Starosta: On Brlek-Reutenauer conjecture, *Theor. Comp. Sci.* **412** (2011), 5649–5655
5. Goce Chadzitaskos, Jiří Tolar: CNOT on polarization states of coherent light, *Revista Mexicana de Física* **S57** (3) (2011), 154–156
6. Taksu Cheon, Pavel Exner, Ondřej Turek: Inverse scattering problem for quantum graph vertices, *Phys. Rev.* **A83** (2011), 062715
7. Daniel Dombek, Zuzana Masáková, Edita Pelantová: Number representation using generalized $(-\beta)$ -transformation, *Theor. Comput. Sci.* **412** (2011), 6653–6665

8. Pavel Exner, Jiří Lipovský: Non-Weyl resonance asymptotics for quantum graphs in a magnetic field, *Phys. Lett.* **A375**, (2011), 805-807
9. Pavel Exner, Hagen Neidhardt, Valentin Zagrebnov: Remarks on Trotter-Kato product formula for unitary groups, *Integral Equations and Operator Theory* **69** (2011), 451-478
10. Pavel Exner, Petr Šeba, Daniel Vařata: Built-up structure criticality, *Physica* **A390** (2011), 3922-3931
11. Christiane Frougny, Edita Pelantová, Milena Svobodová: Parallel addition in non-standard numeration systems, *Theor. Comput. Sci.* **412** (2011), 5714-5727
12. A.M. Grundland, A.M. Hariton, L. Šnobl: Invariant solutions of supersymmetric nonlinear wave equations, *J. Phys. A: Math. Theor.* **44** (2011), 085204
13. Tomáš Kalvoda, Pavel Štovíček: A charged particle in a homogeneous magnetic field accelerated by a time periodic Aharonov-Bohm flux, *Ann. Phys.*, **326** (2011), 2702-2716
14. Tamás Kiss, Stanislav Vymětal, L.D. Tóth, Aurél Gábris, Igor Jex, Gerd Alber: Measurement induced chaos with entangled states, *Phys. Rev. Lett.* **107** (2011), 100501
15. Hynek Lavička, Václav Potoček, Tamás Kiss, Eric Lutz, Igor Jex: Quantum walks with jumps, *Eur. Phys. J.* **D64** (2011), 119-129
16. Daniel Lenz, Zuzana Masáková, Edita Pelantová: Note on powers in three interval exchange transformations, *Theor. Comput. Sci.* **412** (2011), 3788-3794
17. Jaroslav Novotný, Gernot Alber, Igor Jex: Asymptotic dynamics of qubit networks under randomly applied controlled unitary transformations, *New J. Phys.* **13** (2011), 053052
18. Jaroslav Novotný, Gernot Alber, Igor Jex: Entanglement and decoherence: fragile and robust entanglement, *Phys. Rev. Lett.* **107** (2011), 090501
19. A. Schreiber, K.N. Cassemiro, V. Potoček, A. Gábris, I. Jex, Ch. Silberhorn: Decoherence and disorder in quantum walks: From ballistic spread to localization, *Phys. Rev. Lett.* **106** (2011), 180403
20. Boris Shapiro, Miloš Tater: Spectral solutions of the Heun equation, *Acta Polytechnica* **51** (4) (2011), 90-94

21. M. Štefaňák, S.M. Barnett, B. Kollár, T. Kiss, I. Jex: Directional correlations in quantum walks with two particles, *New J. Phys.* **13** (2011), 033029
22. Miloslav Znojil: The horizons of observability in \mathcal{PT} -symmetric four-site quantum lattices, *Acta Polytechnica* **51** (4) (2011), 104-113
23. Miloslav Znojil: Discrete quantum square well of the first kind, *Phys. Lett.* **A375** (2011), 2503-2509
24. Miloslav Znojil: The cryptohermitian smeared-coordinate representation of wave functions, *Phys. Lett.* **A375** (2011), 3176-3183
25. Miloslav Znojil: Decays of degeneracies in \mathcal{PT} -symmetric ring-shaped lattices, *Phys. Lett.* **A375** (2011), 3435-3441

(b2) Accepted earlier, published in 2011, or shortly before

1. Ľubomíra Balková, Edita Pelantová, Štěpán Starosta: Sturmian jungle (or garden?) on multiliteral alphabets, *RAIRO: Theoretical Informatics and Applications* **44** (2010), 443-470
2. Ľubomíra Balková, Edita Pelantová, Štěpán Starosta: Infinite words with finite defect, *Adv. Appl. Math.* **47** (2011), 562-574
3. Hervé Bergeron, Jean-Pierre Gazeau, Petr Siegl, Ahmed Youssef: Semi-classical behavior of Poeschl-Teller coherent states, *EPL* **92** (2010), 60003
4. Thomas Brougham, V. Košťák, Igor Jex, Erika Anderson, Tamás Kiss: Entanglement preparation using symmetric multiports, *Eur. J. Phys.* **D61** (2011), 231-236
5. Thomas Brougham, G.M. Nikolopoulos, Igor Jex: Perfect transfer of multiple excitations in quantum networks, *Phys. Rev.* **A83** (2011), 022323
6. Raffaele Carlone, Pavel Exner: Dynamics of an electron confined to a “hybrid plane” and interacting with a magnetic field, *Rep. Math. Phys.* **67** (2011), 211-227
7. Goce Chadzitaskos: Optical element for X-ray microscopy, *Nucl. Instr. Meth. Phys. Research* **A629** (2011), 206-208
8. Pavel Exner, Jiří Lipovský: On the absence of absolutely continuous spectra for Schrödinger operators on radial tree graphs, *J. Math. Phys.* **51** (2010), 122107

9. Petr Hájíček, Jiří Tolar: Survey of an approach to quantum measurement, classical properties and realist interpretation problems, *Acta Physica Slovaca* **60** (2010), 613-716
10. Craig S. Hamilton, Aurél Gábris, Igor Jex, Stephen M. Barnett: Quantum walk with a four dimensional coin, *New J. Phys.* **13** (2011), 013015
11. Miloslav Havlíček, Severín Pošta: Center of quantum algebra $U'_q(\mathfrak{so3})$, *J. Math. Phys.* **52** (2011), 043521
12. Hector Hernández-Coronado, David Krejčířík, Petr Siegl: Perfect transmission scattering as a \mathcal{PT} -symmetric spectral problem, *Phys. Lett.* **A375** (2011), 2149-2152
13. Vít Jakubský, Luis-Miguel Nieto, Mikhail S. Plyushchay: Klein tunneling in carbon nanostructures: a free particle dynamics in disguise, *Phys. Rev.* **D83** (2011), 047702
14. Petra Košťáková, Pavel Šťovíček: Noncommutative Bloch analysis of Bochner Laplacians with nonvanishing gauge fields, *J. Geom. Phys.* **61** (2011), 727-744
15. David Krejčířík, Enrique Zuazua: The asymptotic behaviour of the heat equation in a twisted Dirichlet-Neumann waveguide, *J. Diff. Eqs.* **250** (2011), 2334-2346
16. Zuzana Masáková, Edita Pelantová: Ito-Sadahiro numbers vs. Parry numbers, *Acta Polytechnica* **51** (4) (2011), 59-64
17. Zuzana Masáková, Edita Pelantová, Tomáš Vávra: Arithmetics in number systems with negative base, *Theor. Comp. Sci.* **412** (2011), 835-845
18. Zuzana Masáková, Tomáš Vávra: Arithmetics in numeration systems with negative quadratic base, *Kybernetika* **47** (2011), 74-92
19. Peter P. Rohde, Andreas Schreiber, Martin Štefaňák, Igor Jex, Christine Silberhorn: Multi-walker discrete time quantum walks on arbitrary graphs, their properties, and their photonic implementation, *New J. Phys.* **13** (2011), 013001
20. Petr Siegl: \mathcal{PT} -symmetric square well – perturbations and the existence of metric operator, *Int. J. Theor. Phys.* **50** (2011), 991-996
21. Štěpán Starosta: On theta-palindromic richness, *Theor. Comp. Sci.* **412** (2011), 1111-1121
22. František Štampach, Pavel Šťovíček: On the eigenvalue problem for a particular class of finite Jacobi matrices, *Linear Alg. Appl.* **434** (2011), 1336-1353

23. Miloslav Znojil: Planarizable supersymmetric quantum toboggans, *SIGMA* **7** (2011), 018, 24pp.
24. Miloslav Znojil: Cryptohermitian Hamiltonians on graphs, *Int. J. Theor. Phys.* **50** (2011), 1052-1059
25. Miloslav Znojil: An exactly solvable quantum-lattice model with a tunable degree of nonlocality, *J. Phys. A: Math. Theor.* **44** (2011), 075302
26. Miloslav Znojil, Miloš Tater: \mathcal{CPT} -symmetric discrete square well, *Int. J. Theor. Phys.* **50** (2011), 982-990
27. Jakub Železný: Spectrum of the metric operator of a simple \mathcal{PT} -symmetric model, *Int. J. Theor. Phys.* **50** (2011), 1012-1018

(c) Accepted for publication in 2011

1. Ľubomíra Balková: Factor frequencies in generalized Thue-Morse words, *Kybernetika*, to appear; arXiv:1107.5033 [math.CO]
2. Denis Borisov, David Krejčířík: The effective Hamiltonian for thin layers with non-Hermitian Robin-type boundary conditions, *Asymp. Anal.*, to appear; arXiv:1102.5051 [math.SP]
3. Pavel Exner, Michal Jex: On the ground state of quantum graphs with attractive δ -coupling, *Phys. Lett. A* (2012), to appear; arXiv:1110.1800 [math-ph]
4. Tomáš Hejda: Morphisms preserving the set of words coding 3-interval exchange, *RAIRO – Theoretical Informatics and Applications*, to appear
5. David Krejčířík, Aldo Pratelli: The Cheeger constant of curved strips, *Pacific J. Math.*, to appear
6. Boris Shapiro, Kouichi Takemura, Miloš Tater: On spectral polynomials of the Heun equation II, *Commun. Math. Phys.* (2012), to appear; arXiv:0904.0650 [math-ph]
7. Štěpán Starosta: Generalized Thue-Morse words and palindromic richness, *Kybernetika*, to appear; arXiv:1104.2476 [math.CO]

(d) Other papers, published and accepted in 2011, or shortly before

1. Goce Chadzitaskos, Petr Luft, Jiří Tolar: Coherent states on the circle, *J. Phys. G: Conf. Series* **284** (2011), 012016

2. Daniel Dombek: Substitutions over infinite alphabet generating $(-\beta)$ -integers, in *Proceedings of the WORDS 2011 conference* (Prague 2011; P. Ambrož et al., eds.), EPTCS 63, pp. 115-121
3. Pavel Exner: Vertex couplings in quantum graphs: approximations by scaled Schrödinger operators, in *Proceedings of the ICM satellite conference "Mathematics in Science and Technology"* (New Delhi 2010; A.H. Siddiqi, R.C. Singh, P. Manchanda, eds.), World Scientific, Singapore 2011; pp. 71-92
4. Pavel Exner, Petr Šeba, Daniel Vašata: Urban structure analysis, in *Mathematical Results in Quantum Physics, Proceedings of the QMath11 conference* (Hradec Králové, September 6-10, 2010), World Scientific, Singapore 2011; pp. 260-264
5. László Kecskes, Tamás Kiss, Martin Štefaňák, et al.: The role of measurement in the recurrence property of discrete timed quantum walks, in *Proceedings of the conference "Photon Counting Applications, Quantum Optics, and Quantum Information Transfer and Processing III"*, SPIE, vol. 8072 (2011)
6. Miroslav Korbelář, Jiří Tolar: Symmetries of finite Heisenberg groups for k-partite systems, *J. Phys. G: Conf. Series* (2012), to appear
7. Jan Kříž: Chaos in the brain, *Acta Phys. Polonica A*, to appear
8. Petr Novotný: Graded contractions of representations of Lie algebras, *J. Phys. G: Conf. Series* (2012), to appear
9. Edita Pelantová, Štěpán Starosta: Infinite words rich and almost rich in generalized palindromes, in *Proceedings of the DLT conference* (Milano 2011; G. Mauri and A. Leporati, eds.), Springer LNCS 6795; pp. 406-416
10. Filip Studnička: Analysis of biomedical signals using differential geometry invariants, *Acta Phys. Polonica A*, to appear

(e) Submitted in 2011, not yet accepted

1. Fabio Bagarello, Miloslav Znojil: The dynamical problem for a non self-adjoint Hamiltonian, [arXiv:1105.4716](https://arxiv.org/abs/1105.4716) [math.FA]
2. Fabio Bagarello, Miloslav Znojil: Non linear pseudo-bosons versus hidden Hermiticity, [arXiv:1109.0605](https://arxiv.org/abs/1109.0605) [quant-ph]

3. Ľubomíra Balková: Factor frequencies in languages invariant under more symmetries, submitted to *Theor. Comput. Sci.*; [arXiv:1107.0471](#) [[math.CO](#)]
4. Goce Chadzitaskos, Petr Luft, Jiří Tolar: Quantizations on the circle and coherent states, *J. Phys. A: Math. Theor.*, submitted
5. Pavel Exner, Diana Barseghyan: Spectral estimates for a class of Schrödinger operators with infinite phase space and potential unbounded from below, *J. Phys. A: Math. Theor.*, submitted; [arXiv:1109.0168](#) [[math-ph](#)]
6. Craig S. Hamilton, Aurel Gábris, Igor Jex, Stephen M. Barnett: General $U(4)$ gate for photon polarization and orbital angular momentum, [arXiv:1012.2704](#) [[quant-ph](#)]
7. Tomáš Hejda, Zuzana Masáková, Edita Pelantová: Greedy and lazy representations of numbers in the negative golden ratio base, [arXiv:1110.6327](#) [[math.DS](#)]
8. Martin Kolb, David Krejčířík: The Brownian traveller on manifolds, [arXiv:1108.3191](#) [[math.AP](#)]
9. David Krejčířík: The improved decay rate for the heat semigroup with local magnetic field in the plane, [arXiv:1101.1806](#) [[math.AP](#)]
10. David Krejčířík, Petr Siegl, Jakub Železný: On the similarity of Sturm-Liouville operators with non-Hermitian boundary conditions to self-adjoint and normal operators, [arXiv:1108.4946](#) [[math.SP](#)]
11. Lenka Motlochová, Jiří Patera: Four families of orthogonal polynomials of C_2 and symmetric and antisymmetric generalizations of sine and cosine functions, [arXiv:1101.3597](#) [[math-ph](#)]
12. Edita Pelantová, Štěpán Starosta: Languages invariant under more symmetries: overlapping factors versus palindromic richness, [arXiv:1103.4051](#)
13. Edita Pelantová, Štěpán Starosta: Palindromic richness and Coxeter groups, [arXiv:1108.3042](#)
14. Martin Štefaňák, Iva Bezděková, Igor Jex: Localization and spreading of three-state quantum walks, *J. Phys. A: Math. Theor.*, submitted
15. Miloslav Znojil: Symbolic-manipulation constructions of Hilbert-space metrics in quantum mechanics, [arXiv:1105.4525](#) [[cs.SC](#)]
16. Miloslav Znojil: Quantum Big Bang without fine-tuning in a toy-model, [arXiv:1105.1282](#) [[gr-qc](#)]

17. Miloslav Znojil: \mathcal{PT} -symmetric quantum models living in an auxiliary Pontryagin space, [arXiv:1110.1218](#) [math-ph]
18. Miloslav Znojil: N -site-lattice analogues of $V(x) = ix^3$, [arXiv:1111.0484](#) [quant-ph]
19. Miloslav Znojil: Scattering along a complex loop in a solvable \mathcal{PT} -symmetric model, [arXiv:1112.2644](#) [math-ph]