Doppler Institute
for Mathematical Physics and Applied Mathematics

2012 List of Publications

(a) Edited volumes, book chapters

1. Petr Ambrož, Štěpán Holub, Zuzana Masáková, eds.: *WORDS 2011, Proceedings of the 8th International Conference*, Electronic Proceedings in Theoretical Computer Science, vol. 63, 2011; 276 pp.

2. Karel Klouda, Zuzana Masáková, Radko Mesiar, Martin Štepnička, eds.: Special issue: ISCAMI and Analytic and algebraic methods 2011 *Kybernetika* **48** (2012), 357–586.

3. Pavel Exner: *Functional analysis*, in "Mathematical Tools for Physicists" (M. Grinfeld, ed.), Wiley 2013, to appear

(b) Research papers in journals

(b1) Accepted and published in 2012

1. Fabio Bagarello, Miloslav Znojil: Non linear pseudo-bosons versus hidden Hermiticity. II: The case of unbounded operators, *J. Phys. A: Math. Theor.* **45** (2012), 115311

2. Rafael D. Benguria, Pablo Gallegos, Matěj Tušek: New estimate on the two-dimensional indirect Coulomb energy, *Ann. Henri Poincaré* **13** (2012), 1733–1744.

3. Rafael D. Benguria, Matěj Tušek: Indirect Coulomb energy for two-dimensional atoms, *J. Math. Phys.* **53** (2012), 095213

4. Hervé Bergeron, Petr Siegl, Ahmed Youssef: New SUSYQM coherent states for Pöschl-Teller potentials: a detailed mathematical analysis, *J. Phys. A: Math. Theor.* **45** (2012), 24402

5. Goce Chadzitaskos, Jan Smotlacha: Contractions of 3-dimensional representations of the Lie algebra $sl(2)$, *J. Gen. Lie Theory Appl.* **6** (2012), 1–6.

6. Goce Chadzitaskos, Petr Luft, Jiří Tolar: Quantizations on the circle and coherent states, *J. Phys. A: Math. Theor.* **45** (2012), 244027

7. Agnieszka Dołhańczuk-Śródka, Zbigniew Ziembik, J. Kříž, Lidmila Hyšplerová, Maria Wacławek: Investigation of committed radiation dose rate and relationships between alkaline metals concentrations in mushroom Xerocomus badius, *Ecol. Chem. Eng.* **19** (2012), 649–664.

8. 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.* **45** (2012), 075204

9. Jiří Hrivnák, Jiří Patera, Severín Pošta: Three-variable exponential functions of the alternating group, *J. Phys. A: Math. Theor.* **45** (2012), 045201

10. Vít Jakubský, Mikhail S. Plyushchay: Supersymmetric twisting of carbon nanotubes, *Phys. Rev.* **D85** (2012), 045035

11. Karel Klouda: Bispecial factors in circular non-pushy D0L languages, *Theoretical Computer Science* **445** (2012), 63–74.

12. Denis Kochan, David Krejčiřík, Radek Novák, Petr Siegl: The Pauli equation with complex boundary conditions, *J. Phys. A: Math. Theor.* **45** (2012), 444019

13. Béla Kollár, Tamás Kiss, Jaroslav Novotný, Igor Jex: Asymptotic dynamics of coined quantum walks on percolation graphs, *Phys. Rev. Lett.* **108** (2012), 230505

14. Miroslav Korbelář, Jiří Tolar: Symmetries of finite Heisenberg groups for multipartite systems, *J. Phys. A: Math. Theor.* **45** (2012), 285305

15. David Krejčiřík, Helena Šediváková: The effective Hamiltonian in curved quantum waveguides under mild regularity assumptions, *Rev. Math. Phys.* **24** (2012), 1250018

16. Georgios M. Nikolopoulos, Antonín Hoskovec, Igor Jex: Analysis and minimization of bending losses in discrete quantum networks, *Phys. Rev.* **A85** (2012), 062319

17. Jaroslav Novotný, Gernot Alber, Igor Jex: Asymptotic properties of quantum Markov chains, *J. Phys. A: Math. Theor.* **45** (2012), 485301

18. Edita Pelantová, Štěpán Starosta: Almost rich words as morphic images of rich words, *Int. J. Found. Comput. Sci.* **23** (2012), 1067–1083.

19. Andreas Schreiber, Aurel Gábris, Peter P. Rohde, Kaisa Laiho, Martin Štefaňák, Václav Potoček, Igor Jex, Craig Hamilton, Christine Silberhorn: A 2D quantum walk simulation of two-particle dynamics, *Science* **336** (2012), 55–58.

20. Petr Siegl, David Krejčiřík: On the metric operator for the imaginary cubic oscillator, *Phys. Rev.* **D86** (2012), 121702(R)

21. Martin Štefaňák, Iva Bezděková, Igor Jex: Continuous deformations of the Grover walk preserving localization, *Eur. J. Phys.* **D66** (2012), 142

22. Miloslav Znojil: Quantum inner-product metrics via recurrent solution of Dieudonné equation, *J. Phys. A: Math. Theor.* **45** (2012), 085302

23. Miloslav Znojil: Quantum catastrophes: a case study, *J. Phys. A: Math. Theor.* **45** (2012), 444036

24. Miloslav Znojil, Géza Lévai: Schrödinger equations with indefinite effective mass, *Phys. Lett.* **A376** (2012), 3000–3005.

25. Miloslav Znojil: N-site-lattice analogues of $V(x) = ix^3$, *Ann. Phys.* **327** (2012), 893–913.

(b2) Accepted earlier, published in 2012, or shortly before

1. Jiří Adam, Jr., Miloš Tater, Emil Truhlík, Evgeny Epelbaum, Ruprecht Machleidt, Paolo Ricci: Calculation of doublet capture rate for muon capture in deuterium within chiral effective field theory, *Phys. Lett.* **B709** (2012), 93–100.

2. Petr Ambrož, Daniel Dombek, Zuzana Masáková, Edita Pelantová: Numbers with integer expansion in the numeration system with negative base, *Funct. Approx. Comment. Math.* **47** (2012), 241–266.

3. Fabio Bagarello, Miloslav Znojil: The dynamical problem for a non self-adjoint Hamiltonian, *Operator Theory: Advances and Applications* **212** (2012), 109–119.

4. Ľubomíra Balková: Factor frequencies in languages invariant under symmetries preserving factor frequencies, *Integers – Electronic Journal of Combinatorial Number Theory* **12** (2012), A36

5. Ľubomíra Balková: Factor frequencies in generalized Thue-Morse words, *Kybernetika* **48** (2012), 371–385.

6. Lucia Barčiaková, Jan Pirk, Petr Šeba, Jan Kříž: The development of ballistocardiography from 1877 to the present, *Cor et Vasa* **53** (2012), 72–74.

7. Denis Borisov, David Krejčiřík: The effective Hamiltonian for thin layers with non-Hermitian Robin-type boundary conditions, *Asymp. Anal.* **76** (2012), 49–59.

8. Pavel Exner: Decay law regularity (an open problem), *Integral Equations and Operator Theory* **772** (2012), 1–2.

9. Pavel Exner, Michal Jex: On the ground state of quantum graphs with attractive δ-coupling, *Phys. Lett.* **A376** (2012), 713–717.

10. Christiane Frougny, Karel Klouda: Rational base number systems for p-adic numbers, *RAIRO: Theoretical Informatics and Applications* **46** (2012), 87-–106.

11. Tomáš Hejda: Morphisms preserving the set of words coding three interval exchange, *RAIRO: Theoretical Informatics and Applications* **46** (2012), 107–122.

12. David Krejčiřík: $\mathcal{PT}$-symmetric waveguides and the lack of variational techniques (an open problem), *Integral Equations and Operator Theory* **73** (2012), 1–2.

13. Boris Shapiro, Kouichi Takemura, Miloš Tater: On spectral polynomials of the Heun equation II, *Commun. Math. Phys.* **311** (2012), 277–300.

14. Petr Siegl: $\mathcal{PT}$-Symmetric Laplace-Beltrami operator in the strip on a sphere (an open problem), *Integral Equations and Operator Theory* **73** (2012), 5–6.

15. Štěpán Starosta: Generalized Thue-Morse words and palindromic richness, *Kybernetika* **48** (2012), 361—370.

16. Miloslav Znojil: Matrix Hamiltonians with a chance of being complex symmetric, *Integral Equations and Operator Theory* **74** (2012), 5–6.

17. Miloslav Znojil: $\mathcal{PT}$-symmetric quantum models living in an auxiliary Pontryagin space, *J. Math. System Sci.* **2** (2012), 102–109.

(c) Accepted for publication in 2012

1. Denis Borisov, Pavel Exner, Anastasia Golovina: Tunneling resonances in systems without a classical trapping, *J. Math. Phys.*, to appear;

`arXiv: 1210.0449 [math-ph]`

2. Pavel Exner, Diana Barseghyan: Spectral estimates for Dirichlet Laplacians and Schroedinger operators on geometrically nontrivial cusps, *J. Spect. Theory*, to appear; `arXiv:1203.2098 [math-ph]`

3. Pavel Exner, Diana Barseghyan: Spectral analysis of Schroedinger operators with unusual semiclassical behavior, *Acta Polytechnica*, to appear

4. Pavel Exner, Olaf Post: Approximation of quantum graph vertex couplings by scaled Schroedinger operators on thin branched manifolds, *Commun. Math. Phys.*, to appear; `arXiv: 1205.5129 [math-ph]`

5. Miloslav Znojil: Crypto-unitary forms of quantum evolution operators, *Int. J. Theor. Phys.*, to appear; `arXiv:1204.5989 [quant-ph]`

6. Miloslav Znojil: Coulomb potential and the paradoxes of PT-symmetrization, *J. Engin. Math.*, to appear; `arXiv:1204.1257 [quant-ph]`

7. Miloslav Znojil: Quantum star-graph analogues of PT-symmetric square wells, *Can. J. Phys.*, to appear; `arXiv:1205.5211 [quant-ph]`

8. Miloslav Znojil, Hendrik B. Geyer: Smeared quantum lattices exhibiting $\mathcal{PT}$-symmetry with positive $\mathcal{P}$, *Fortschritte der Physik* **61** (2013), to appear; `arXiv:1201.5058 [quant-ph]`

(d) Other papers, published and accepted in 2012, or shortly before

1. Pierre Arnoux, Štěpán Starosta: Rauzy gasket, in "Further Developments in Fractals and Related Fields" (J. Barral, S. Seuret, eds.), *Trends in Mathematics*, Springer, New York 2013

2. Daniel Dombek: Substitutions over infinite alphabet generating $(-\beta)$-integers, *J. Found. Comp. Sci.*, to appear; `arXiv:1108.3627 [cs.DM]`

3. Daniel Dombek, Lájos Hajdu, Attila Petho: Representing algebrai integers as linear combinations of units, *Period. Math. Hung.*, to appear

4. Pavel Exner: Solvable models of resonances and decays, in proceedings of the conference "Mathematical Physics, Spectral Theory and Stochastic Analysis" (Goslar 2011), to appear; `arXiv: 1205.0512 [math-ph]`

5. Pavel Exner: Momentum operators on graphs, in *Fritz Gesztesy Festschrift*, to appear; `arXiv: 1205.5941 [math-ph]`

6. Miroslav Korbelář, Jiří Tolar: Symmetries of finite Heisenberg groups for k-partite systems, *J. Phys. G: Conf. Series* **343** (2012), 012122

7. Zuzana Masáková, Edita Pelantová: Purely periodic expansions in systems with negative base, *Acta Math. Hungarica*, to appear; `arXiv: 1202.1948 [math.NT]`

8. Petr Novotný: Graded contractions of representations of Lie algebras, *J. Phys. G: Conf. Series* **343** (2012), 012089

9. Filip Studnička, Petr Šeba, Daniel Jezbera, Jan Kříž: Continuous monitoring of heart rate using accelerometric sensors, in proceedings of "35th International Conference on Telecommunications and Signal Processing" (TSP 2012), pp. 559-561.

10. Miloslav Znojil: Quantum Big Bang without fine-tuning in a toy-model, *J. Phys. G: Conf. Ser.* **343** (2012), 012136

(e) Submitted in 2012, not yet accepted

1. Ľubomíra Balková, Edita Pelantová, Štěpán Starosta: Proof of Brlek-Reutenauer conjecture, *Theor. Comp. Sci.*, submitted

2. Pavel Exner, Diana Barseghyan: Spectral estimates for Dirichlet Laplacians on perturbed twisted tubes, *Operators and Matrices*, submitted; `arXiv:1211.0401 [math-ph]`

3. Pavel Exner, Konstantin Pankrashkin: Strong coupling asymptotics for a singular Schrödinger operator with an interaction supported by an open arc, *Commun. PDE*, submitted; `arXiv: 1207.2271 [math-ph]`

4. Pedro Freitas, Petr Siegl: Spectra of graphene nanoribbons with armchair and zigzag boundary conditions, *submitted*

5. Christiane Frougny, Edita Pelantová, Milena Svobodová: Minimal digit sets for parallel addition in non-standard numeration systems, *submitted*

6. Tomáš Hejda, Zuzana Masáková, Edita Pelantová: On the negative base greedy and lazy representations in "14eme Journées Montoises d'Informatique Théorique", No. 23 (2012)

7. Vít Jakubský: Potential algebras of low-dimensional Dirac operators: applications, *submitted*; `arXiv:1209.4980 [hep-th]`

8. David Krejčiřík, Zhiqin Lu: Location of the essential spectrum in curved quantum layers, *submitted*; `arXiv:1211.2541 [math.DG]`

9. Zuzana Masáková, Edita Pelantová: Optimal number representations in negative bases, *submitted* `arXiv:1208.1413 [math.NT]`

10. František Štampach, Pavel Šťovíček: The characteristic function for Jacobi matrices with applications, *submitted*; `arXiv:1201.1743 [math.SP]`

11. Tomáš Vávra: Negative base arithmetics: quadratic Pisot case, in "14eme Journées Montoises d'Informatique Théorique", No. 23 (2012)

(e) Patents

1. Goce Chadzitaskos: Optical element for X-ray microscopy, *European Patent Office*, 2168130.2012-06-06, 2012