Doppler Institute

for Mathematical Physics and Applied Mathematics

2013 List of Publications

(a) Edited volumes, book chapters

1. Georgios M. Nikolopoulos, Igor Jex, eds.: *Quantum State Transfer and Network Engineering*, in the series "Quantum Science and Technology"; x+250 p.; Springer, Heidelberg 2014.
2. Pavel Exner: *Functional analysis*, in "Mathematical Tools for Physicists" (M. Grinfeld, ed.), Wiley 2014, to appear

(b) Research papers in journals

(b1) Accepted and published in 2013

1. Ľubomíra Balková, Aranka Hrušková: Continued fractions of quadratic numbers, *Acta Polytechnica* **53** (4) (2013), 322–328.
2. Ľubomíra Balková, Edita Pelantová, Štěpán Starosta: Proof of Brlek-Reutenauer conjecture, *Theor. Comp. Sci.* **475** (2013), 120–125.
3. Mark Bodner, Goce Chadzitaskos, Jiří Patera, Agnieszka Tereszkiewicz: Proposal of new optical elements, *Acta Polytechnica* **53** (5) (2013), 395–398.
4. Denis Borisov, Pavel Exner, Anastasia Golovina: Tunneling resonances in systems without a classical trapping, *J. Math. Phys.* **54** (2013), 012102

5. Goce Chadzitaskos, Jiří Tolar: Proposal of new optical elements, *Acta Polytechnica* **53** (5) (2013), 405–409.

6. Goce Chadzitaskos, Costas Daskaloyannis, Jan Smotlacha: Three boson interaction process: spectra and coherent states, *J. Mod. Optics* **60** (2013), 479–487.

7. Francisco Correa, Vít Jakubský: Finite-gap twists of carbon nanotubes and an emergent hidden supersymmetry, *Phys. Rev.* **D87** (2013), 085019

8. Pavel Exner, Diana Barseghyan: Spectral estimates for Dirichlet Laplacians and Schroedinger operators on geometrically nontrivial cusps, *J. Spect. Theory* **3** (2013), 465–484.

9. Pavel Exner, Diana Barseghyan: Spectral analysis of Schroedinger operators with unusual semiclassical behavior, *Acta Polytechnica* **53** (2013), 271–279.

10. Pavel Exner, Michal Jex: Spectral asymptotics of a strong δ' interaction on a planar loop, *J. Phys. A: Math. Theor.* **46** (2013), 345201

11. Pavel Exner, Jiří Lipovský: Resonances on hedgehog manifolds, *Acta Polytechnica* **53** (2013), 416–426.

12. Pavel Exner, Stepan S. Manko: Approximations of quantum-graph vertex couplings by singularly scaled potentials, *J. Phys. A: Math. Theor.* **46** (2013), 345202

13. Pavel Exner, Olaf Post: Approximation of quantum graph vertex couplings by scaled Schroedinger operators on thin branched manifolds, *Commun. Math. Phys.* **322** (2013), 207–227.

14. Christiane Frougny, Edita Pelantová, Milena Svobodová: Minimal digit sets for parallel addition in non-standard numeration systems, *Journal of Integer Sequences* **16** (2013), 13.2.17

15. Lenka Háková, Jiří Hrivnák, Jiří Patera: Four families of Weyl group orbit functions of B_3 and C_3, *J. Math. Phys.* **54** (2013), 083501

16. Miloslav Havlíček, Severín Pošta: Note on Verma bases for representations of simple Lie algebras, *Acta Polytechnica* **5** 3 (5) (2013), 450–456.

17. Vít Jakubský: Applications of the potential algebras of the two-dimensional Dirac-like operators, *Ann. Phys.* **331** (2013), 216–235.

18. Vít Jakubský, S. Kuru, J. Negro, S. Tristao: Supersymmetry in spherical molecules and fullerenes under perpendicular magnetic fields, *J. Phys.: Cond. Mat.* **25** (2013), 165301

19. Sylwia Kondej, David Krejčiřík: Spectral analysis of a quantum system with a double line singular interaction, *Publ. RIMS* **49** (2013), 831–859.

20. Regina Kruse, Fabian Katzschmann, Andreas Christ, Andreas Schreiber, Sarah Wilhelm, Kaisa Laiho, Aurél Gábris, Craig S. Hamilton, Igor Jex, Christine Silberhorn: Spatio-spectral characteristics of parametric down-conversion in waveguide arrays, *New J. Phys.* **15** (2013), 083046

21. Zuzana Masáková, Edita Pelantová: Optimal number representations in negative bases, *Acta Math. Hungar.* **140** (2013), 329–340.

22. Zuzana Masáková, Edita Pelantová: Itineraries induced by exchange of two intervals, *Acta Polytechnica* **53** (5) (2013), 444–449.

23. Satoshi Ohya: Recurrence relations for finite-temperature correlators via AdS_2/CFT_1, *JHEP* **12** (2013), 011

24. Peter P. Rohde, Andreas Schreiber, Martin Štefaňák, Igor Jex, Aleksei Gilchrist, Christine Silberhorn: Increasing the dimensionality of quantum walks using multiple walkers, *J. Comp. Theor. Nanosci.* **10** (2013), 1644–1652.

25. František Štampach, Pavel Šťovíček: The characteristic function for Jacobi matrices with applications, *Linear Alg. Appl.* **438** (2013), 4130–4155.

26. Miloslav Znojil: Crypto-unitary forms of quantum evolution operators, *Int. J. Theor. Phys.* **52** (2013), 2038–2045.

27. Miloslav Znojil: Coulomb potential and the paradoxes of PT-symmetrization, *J. Engin. Math.* **82** (2013), 173–185.

28. Miloslav Znojil: Non-Hermitian star-shaped quantum graphs, *Acta Polytechnica* **53** (3) (2013), 317–321.

29. Miloslav Znojil: New concept of solvability in quantum mechanics, *Acta Polytechnica* **53** (5) (2013), 473–482.

30. Miloslav Znojil: Solvable model of quantum phase transitions and the symbolic-manipulation-based study of its multiply degenerate exceptional points and of their unfolding, *Ann. Phys.* **336** (2013), 98–111.

31. Miloslav Znojil, Hendrik B. Geyer: Smeared quantum lattices exhibiting $\mathcal{PT}$-symmetry with positive $\mathcal{P}$, *Fortschritte der Physik* **61** (2013), 111–123.

32. Miloslav Znojil, Junde Wu: A generalized family of discrete PT-symmetric square wells, *Int. J. Theor. Phys.* **52** (2013), 2152–2162.

(b2) Accepted earlier, published in 2013, or shortly before

1. Tomáš Hejda, Zuzana Masáková, Edita Pelantová: Greedy and lazy representations of numbers in the negative base, *Kybernetika* **49** (2013), 258–279.

2. David Krejčiřík: The improved decay rate for the heat semigroup with local magnetic field in the plane, *Calc. Var. Partial Differ. Equ.* **47** (2013), 207–226.

3. Edita Pelantová, Štěpán Starosta: Languages invariant under more symmetries: overlapping factors versus palindromic richness, *Discrete Mathematics* **313** (2013), 2432–2445.

4. Miloslav Znojil: Quantum star-graph analogues of PT-symmetric square wells, *Can. J. Phys.* **90** (2012), 1287–1293.

(c) Accepted for publication in 2013

1. Karel Břinda, Edita Pelantová, Ondřej Turek: Balances of m-bonacci words, *Fundamenta Informaticae*, to appear

2. Goce Chadzitaskos, Lenka Háková, Ondřej Kájínek: Weyl group orbit functions in image processing, *Appl. Math.* 5 (2014), to appear

3. Pavel Exner, Diana Barseghyan: Spectral estimates for Dirichlet Laplacians on perturbed twisted tubes, *Operators and Matrices*, to appear

4. Pavel Exner, Ari Laptev, Muhammad Usman: On some sharp spectral inequalities for Schroedinger operators on semi-axis, *Commun. Math. Phys.*, to appear

5. Pavel Exner, Konstantin Pankrashkin: Strong coupling asymptotics for a singular Schrödinger operator with an interaction supported by an open arc, *Commun. PDE*, to appear

6. Pavel Exner, Christian Seifert, Peter Stollmann: Absence of absolutely continuous spectrum for the Kirchhoff Laplacian on radial trees, *Ann. Henri Poincaré*, to appear

7. Martin Kolb, David Krejčiřík: The Brownian traveller on manifolds, *J. Spectral Theory*, to appear

8. David Krejčiřík: Spectrum of the Laplacian in narrow tubular neighbourhoods of hypersurfaces with combined Dirichlet and Neumann boundary conditions, *Math. Bohemica*, to appear

9. David Krejčiřík, Petr Siegl, Jakub Železný: On the similarity of Sturm-Liouville operators with non-Hermitian boundary conditions to self-adjoint and normal operators, *Complex Anal. Oper. Theory*, to appear

10. Oksana Kuriksha, Severín Pošta, Olena Vaneeva: Group classification of variable coefficient generalized Kawahara equationsn, *J. Phys. A.: Math. Theor.* **47** (2014), to appear

11. Zuzana Masáková, Tomáš Vávra: Integers in number systems with positive and negative quadratic Pisot base, *RAIRO: Theor. Inf. Appl.*, to appear

12. Edita Pelantová, Štěpán Starosta: Palindromic richness for languages invariant under more symmetries, *Theor. Comp. Sci.*, to appear

13. Jiří Tolar: A classification of finite quantum kinematics, *J. Phys.: Conf. Series* (2014), to appear

(d) Other papers, published and accepted in 2013, or shortly before

1. Agata Bezubik, Jiří Hrivnák, Severín Pošta: Two dimensional symmetric and antisymmetric exponential functions and orthogonal polynomials, *J. Phys.: Conf. Series* **411** (2013), 012007

2. Agata Bezubik, Severín Pošta: Interpolation via symmetric exponential functions, *J. Phys.: Conf. Series* **474** (2013), 012011

3. Pavel Exner: Solvable models of resonances and decays, in proceedings of the conference "Mathematical Physics, Spectral Theory and Stochastic Analysis" (Goslar 2011; M. Demuth, W. Kirsch, eds.), Birkhäuser, Basel 2013; pp. 165–227.

4. Pavel Exner: Momentum operators on graphs, in "Spectral Analysis, Differential Equations and Mathematical Physics: A Festschrift in Honor of Fritz Gesztesy's 60th Birthday" (H. Holden, B. Simon, G. Teschl, eds.), Proc. Symp. Pure Math., vol. 87, AMS, Providence, R.I.; pp. 105-118

5. Jan Fuksa, Severín Pošta: Generating functions for tensor product decomposition, *J. Phys.: Conf. Series* **474** (2013), 012018

6. Georgios M. Nikolopoulos, Thomas Brougham, Antonín Hoskovec, Igor Jex: Communication in engineered quantum networks, in "Quantum State Transfer and Network Engineering", Springer 2014; pp. 39-86

7. Jiří Tolar: A classification of finite quantum kinematics, *J. Phys.: Conf. Series* (2014), to appear

(e) Submitted in 2013, not yet accepted

1. Ľubomíra Balková, Michelangelo Bucci, Alessandro De Luca, Jiří Hladký, Svetlana Puzynina: Aperiodic pseudorandom number generators based on infinite words, submitted

2. Diana Barseghyan, Pavel Exner: A regular version of Smilansky model, submitted (`arXiv: 1308.4249 [math-ph]`)

3. Jussi Behrndt, Pavel Exner, Vladimir Lotoreichik: Schrödinger operators with δ and δ'-interactions on Lipschitz surfaces and chromatic numbers of associated partitions, submitted (`arXiv: 1307.0074 [math-ph]`)

4. V.B. Belyaev, P. Ricci, F. Šimkovic, J. Adam, Jr., M. Tater, E. Truhlík: Strongly magnetized iron white dwarfs and the total lepton number violation, submitted (`arXiv: 1312.5343 [nucl-th]`)

5. Daniel Dombek: Generating $(\pm\beta)$-integers by conjugated morphisms, submitted

6. Daniel Dombek, Zuzana Masáková, Tomáš Vávra: Confluent Parry numbers, integers in positive and negative non-integer base and conjugated morphisms, submitted

7. Daniel Dombek, Zuzana Masáková, Volker Ziegler: On distinct unit generated fields that are totally complex, submitted

8. Pavel Exner, Stepan S. Manko: Approximations of quantum-graph vertex couplings by singularly scaled rank-one operators, submitted (`arXiv: 1310.5856 [math.SP]`)

9. Pavel Exner, Alexander Minakov: Asymptotic eigenvalue estimates for a Robin problem with a large parameter, submitted (`arXiv: 1312.7293 [math-ph]`)

10. Pedro Freitas, Jiří Lipovský: Eigenvalue asymptotics for the damped wave equation on metric graphs, subm. (`arXiv: 1307.6377 [math-ph]`)

11. Christiane Frougny, Pavel Heller, Edita Pelantová, Milena Svobodová: k-block versus 1-block parallel addition in non-standard numeration systems, submitted

12. Amru Hussein, David Krejčiřík, Petr Siegl: Non-self-adjoint graphs, submitted (`arXiv:1308.4264 [math.SP]`)

13. Tatiana Jajcayová, Edita Pelantová, Štěpán Starosta: Palindromic closure using multiple antimorphisms, subm. (`arXiv:1306.6784 [math.CO]`)

14. Vít Jakubský, S. Kuru, J. Negro: Carbon nanotubes in almost homogeneous transverse magnetic field: exactly solvable model, submitted (`arXiv:1306.2115 [cond-mat.mes-hall]`)

15. David Krejčiřík, Nicholas Raymond: Magnetic effects in curved quantum waveguides, submitted (`arXiv:1303.6844 [math-ph]`)

16. David Krejčiřík, Nicholas Raymond, Matěj Tušek: The magnetic Laplacian in shrinking tubular neighbourhoods of hypersurfaces, submitted (`arXiv:1303.4753 [math-ph]`)

17. Stepan S. Manko: Quantum-graph vertex couplings: some old and new approximations, submitted

18. Zuzana Masáková, Edita Pelantová: Enumerating Abelian returns to Sturmian prefixes, submitted

19. Boris Mityagin, Petr Siegl: Root system of singular perturbations of the harmonic oscillator type operators, submitted (`arXiv:1307.6245 [math.SP]`)

20. Boris Mityagin, Petr Siegl, Joe Viola: Differential operators admitting various rates of spectral projection growth, submitted (`arXiv:1309.3751 [math.SP]`)

21. Satoshi Ohya: A Simple derivation of finite-temperature CFT correlators from BTZ black hole, submitted (`arXiv:1312.7348 [hep-th]`)

22. Edita Pelantová, Tomáš Hejda: Spectral properties of cubic complex Pisot units, submitted (`arXiv:1312.0653 [math.MG]`)

23. Martin Štefaňák, Iva Bezděková, Igor Jex, S.M. Barnett: Stability of point spectrum for three-state quantum walks on a line, submitted (`arXiv: 1309.7835 [quant-ph]`)

24. Miloslav Znojil: $\mathcal{PT}$-symmetry and level-crossing paradox, submitted (`arXiv:1303.4876 [quant-ph]`)

25. Miloslav Znojil, Raymond F. Bishop: The coupled-cluster approach to quantum many-body problem in a three-Hilbert-space reinterpretation, submitted (`arXiv:1311.6295 [quant-ph]`)

(e) Patents

1. Goce Chadzitaskos: Goce Chadzitaskos: *Roentgen Telescope*, Patent CZ 303940. 2013-05-22