Doppler Institute

for Mathematical Physics and Applied Mathematics

2019 List of Publications

(a) Research papers in journals

(a1) Accepted and published in 2019

1. Petr Ambrož, Ondřej Kadlec, Zuzana Masáková, Edita Pelantová: A note on palindromic length of Sturmian sequences, *Theor. Comput. Sci.* **780** (2019), 74-83

2. Petr Ambrož, Zuzana Masáková, Jan Mazáč: Linear mappings as self-similarities of mathematical models of quasicrystals, *J. Phys.: Conf. Ser.* **1194** (2019), 012005

3. Jussi Behrndt, Pavel Exner, Markus Holzmann, Vladimir Lotoreichik: On Dirac operators in $\mathbb{R}^3$ with electrostatic and Lorentz scalar δ-shell interactions, *Quantum Studies: Mathematics and Foundations* **6** (2019), 295-314

4. Sebastian Bertrand, Libor Šnobl: On rotationally invariant integrable and superintegrable classical systems in magnetic fields with non-subgroup type integrals, *J. Phys. A: Math. Theor.* **52** (2019), 195201

5. Denis I. Borisov: Estimates of initial scales for layers with small random negative-definite perturbations, *J. Math. Sci.* **241** (2019), 518-548

6. Denis I. Borisov: Gaps in the spectrum of the Laplacian in a strip with periodic delta interaction, *Proc. Steklov Inst. Math.* **305** (2019), S16-S23

7. Denis I. Borisov: Bethe-Sommerfeld conjecture for periodic Schrödinger operators in strip, *J. Math. Anal. Appl.* **479** (2019), 260-282

8. Denis I. Borisov, Maral N. Konyrkulzhaeva: Spectrum of the Schrödinger operator on the simplest graph with a small edge, *J. Math. Sci.* **239** (2019), 518-548

9. Denis I. Borisov, Dmitry A. Zezyulin: Spacing gain and absorption in a simple $\mathcal{PT}$-symmetric model: Spectral singularities and ladders of eigenvalues and resonances, *J. Phys. A: Math. Theor.* **52** (2019), 445202

10. Leontýna Břízová, Jan Kříž, Filip Studnička, Jan Šlégr: Methods for the evaluation of the stochastic properties of the ionosphere for earthquake prediction–random matrix theory, *Atmosphere* **10** (2019), 413

11. Biagio Cassano, Fabio Pizzichillo: Self-adjointness for the Dirac operator with Coulomb-type spherically symmetric perturbations via boundary conditions, *J. Math. Phys.* **60** (2019), 041502

12. Alonso Contreras-Astorga, Vít Jakubský: Photonic systems with two-dimensional landscapes of complex refractive index via time-dependent supersymmetry, *Phys. Rev.* **A99** (2019), 053812

13. Pavel Exner: An optimization problem for finite point interaction families, *J. Phys. A: Math. Theor.* **52** (2019), 405302

14. Pavel Exner, Jiří Lipovský: Spectral asymptotics of the Laplacian on Platonic solids graphs, *J. Math. Phys.* **60** (2019), 122101

15. Josef Florian, Tereza Velká, Ľubomíra Dvořáková: Normalization of ternary generalized pseudostandard words, *Theor. Comput. Sci.* **780** (2019), 29-53

16. Pedro Freitas, Jiří Lipovský: Spectral determinant for the damped wave equation on an interval, *Acta Physica Polonica* **A136** (2019), 817-823

17. Miloslav Havlíček, Jan Kotrbatý, Patrick Moylan, Severín Pošta: (Heisenberg-)Weyl algebras, Segal-Bargmann transform and representations of Poincaré groups, *J. Phys.: Conf. Ser.* **1194** (2019), 012043

18. Christos Koukouvinos, Khalide Jbilou, Marilena Mitrouli, Ondřej Turek: An eigenvalue approach for estimating the generalized cross validation function for correlated matrices, *Electron. J. Linear Alg.* **35** (2019), 482-496

19. David Krejčiřík: Complex magnetic fields: An improved Hardy-Laptev-Weidl inequality and quasi-self-adjointness, *SIAM J. Math. Anal.* **51** (2019), 790–807

20. Regina Kruse, Craig S. Hamilton, Linda Sansoni, Sonja Barkhofen, Christine Silberhorn, Igor Jex: Detailed study of Gaussian boson sampling, *Phys. Rev.* **A100** (2019), 032326

21. Michal Ławniczak, Jiří Lipovský, and Leszek Sirko: Non-Weyl microwave graphs, *Phys. Rev. Lett.* **122** (2019), 140503

22. Lennart Lorz, Evan Meyer-Scott, Thomas Nitsche, Václav Potoček, Aurél Gábris, Sonja Barkhofen, Igor Jex, Christine Silberhorn: A photonic quantum walk with a four-dimensional coin, *Phys. Rev. Res.* **1** (2019), 033036

23. Vladimir Lotoreichik, Thomas Ourmières-Bonafos: A sharp upper bound on the spectral gap for graphene quantum dots, *Math. Phys. Anal. Geom.* **22** (2019), 13

24. Martin Malachov, Igor Jex, Orsolya Kálmán, Tamás Kiss: Phase transition in iterated quantum protocols for noisy inputs, *Chaos: An Interdisciplinary Journal of Nonlinear Science* **29** (2019), 033107

25. Jan Mareš, Jaroslav Novotný, Igor Jex: Percolated quantum walks with a general shift operator: From trapping to transport, *Phys. Rev.* **A99** (2019), 042129

26. Maryna Nesterenko, Severín Pošta: Discrete analysis on non-cubic lattices, *J. Phys.: Conf. Ser.* 1416 (2019), 012024

27. František Štampach, Pavel Šťovícek: Spectral representation of some weighted Hankel matrices and orthogonal polynomials from the Askey scheme, *J. Math. Anal. Appl.* **472** (2019), 483-509

28. Pavel Šťovíček: On infinite Jacobi matrices with a trace class resolvent, *J. Approx. Theory* **249** (2020), 483-509

29. Miloslav Znojil: Generalized Bose-Hubbard Hamiltonians exhibiting a complete non-Hermitian degeneracy, *Ann. Phys.* **405** (2020), 325-339

30. Miloslav Znojil: Unitarity corridors to exceptional points, *Phys. Rev.* **A100** (2020), 032124

31. Miloslav Znojil, František Růžička: Multi-well log-anharmonic oscillators, *Mod. Phys. Lett.* **A34** (2020), 1950085

(a2) Accepted earlier, published in 2019, or shortly before

1. Diana Barseghyan, Andrii Khrabustovskyi: Spectral estimates for Dirichlet Laplacian on tubes with exploding twisting velocity, *Operators and Matrices* **13** (2019), 311-322

2. Luca Fanelli, David Krejčiřík: Location of eigenvalues of three-dimensional non-self-adjoint Dirac operators, *Lett. Math. Phys.* **109** (2019), 1473-1485

3. Christiane Frougny, Marta Pavelka, Edita Pelantová, Milena Svobodová: On-line algorithms for multiplication and division in real and complex numeration systems, *Discrete Mathematics and Theoretical Computer Science* **21** (2019), 14

4. Jaroslav Hančl, Ondřej Turek: One-sided Diophantine approximations, *J. Phys. A: Math. Theor.* **52** (2019), 045205

5. David Krejčiřík, Gian Paolo Leonardi, Petr Vlachopulos: The Cheeger constant of curved tubes, *Arch. Math.* **112** (2019), 429-436

6. David Krejčiřík, Vladimir Lotoreichik, Miloslav Znojil: The minimally anisotropic metric operator in quasi-Hermitian quantum mechanics, *Proc. Roy. Soc.* **A474** (2018) 20180264

7. David Krejčiřík, Petr Siegl: Pseudomodes for Schrödinger operators with complex potentials, *J. Funct. Anal.* **276** (2019), 2856-2900

8. David Krejčiřík, Matěj Tušek: Location of hot spots in thin curved strips, *J. Diff. Eqs* **266** (2019), 2953-2977

9. Bekir Can Lütfüoglu, Jan Kříž: A comparative interpretation of the thermodynamic functions of a relativistic bound state problem proposed with an attractive or a repulsive surface effect, *Eur. Phys. J. Plus* **134** (2019), 60

10. Marilena Mitrouli, Ondřej Turek: Determinantal properties of generalized circulant Hadamard matrices, *Electron. J. Linear Algebra* **34** (2018), 639-651

11. Ondřej Turek: Gaps in the spectrum of a cuboidal periodic lattice graph, *Rep. Math. Phys.* **52** (2019), 107-127

12. Ondřej Turek, Dardo Goyeneche: A generalization of circulant Hadamard and conference matrices, *Lin. Alg. Appl.* **569** (2019), 241-265

13. Miloslav Znojil, Františk Růžička: Nonlinearity of perturbations in $\mathcal{PT}$-symmetric quantum mechanics, *J.Phys.:Conf.Ser.* **1194** (2019), 012120

(b) Accepted for publication in 2019

1. Petr Ambrož, Zuzana Masáková: Description of Voronoi tiles in quasicrystals with 8-fold symmetry, *J. Phys.: Conf. Ser.*, to appear

2. Diana Barseghyan, Baruch Schneider: Eigenvalue bound for Schroedinger operators with unbounded magnetic field,*Rep. Math. Phys.*, to appear

3. Jussi Behrndt, Pavel Exner, Markus Holzmann, Vladimir Lotoreichik: The Landau Hamiltonian with δ potentials supported on curves, *Rev. Math. Phys.*, to appear

4. Denis I. Borisov, Pavel Exner: Gap opening in two-dimensional periodic systems, *Commun. Contemp. Math.*, to appear

5. Philippe Briet, Hamza Abdou Soimadou, David Krejčiřík: Spectral analysis of sheared nanoribbons, *ZAMP*, to appear

6. Biagio Cassano, Vladimir Lotoreichik: Self-adjoint extensions of the two-valley Dirac operator with discontinuous infinite mass boundary conditions, *Operators and Matrices*, to appear

7. Biagio Cassano, Fabio Pizzichillo, Luis Vega: A Hardy-type inequality and some spectral characterizations for the Dirac-Coulomb operator, *Rev. Mat. Complutense*, to appear

8. Lucrezia Cossetti, David Krejčiřík: Absence of eigenvalues of non-self-adjoint Robin Laplacians on the half-space, *Proc. London Math Soc.*, to appear

9. Pavel Exner, Sylwia Kondej: Spectral optimization for strongly singular Schrödinger operators with a star-shaped interaction, *Lett. Math. Phys.*, to appear

10. Pavel Exner, Vladimir Lotoreichik: Spectral asymptotics of the Dirichlet Laplacian on a generalized parabolic layer, *Int. Eqs Operator Theory*, to appear

11. Rupert L. Frank, Dirk Hundertmark, Michal Jex, Phan Thanh Nam: The Lieb-Thirring inequality revisited, *J. Eur. Math. Soc.*, to appear

12. Christos Koukouvinos, Angeliki Lappa, Marilena Mitrouli, Paraskevi Roupa, Ondřej Turek: Numerical methods for estimating the tuning parameter in penalized least squares problems, *Comm. Statist. Simul. Comput.*, to appear

13. Christos Koukouvinos, Marilena Mitrouli, Ondřej Turek: Efficient estimates in regression models with highly correlated covariates, *J. Comp. Appl. Math.*, to appear

14. Zuzana Masáková, Jan Mazáč: Pentagonal quasicrystals and their linear self-similarities, *J. Phys.: Conf. Ser.*, to appear

15. Kateřina Medková, Edita Pelantová, Laurent Vuillon: Derivated sequences of complementary symmetric Rote sequences, *RAIRO: Theor. Inf. Appl.*, to appear

16. Jaroslav Novotný, Jan Mareš, Igor Jex: Quantum walk transport on carbon nanotube structures, *Phys. Lett. A*, to appear

17. Hanka Řada, Štepán Starosta: Bounds on the period of the continued fraction after a Möbius transformation, *Journal of Number Theory* **743** (2018), 23-37

18. David J. Stonner, Jaroslav Kysela, Graeme Weir, Jaroslav Novotný, Gernot Alber, Igor Jex: Deterministic twirling with low resources, *Phys. Lett. A*, to appear

(c) Other papers, published and accepted in 2019, or shortly before

1. Petr Ambrož, Edita Pelantová: Palindromic length of words and morphisms in class P, in "Developments in Language Theory (DLT 2019)" (P. Hofman, M. Skrzypczak M., eds.), Lecture Notes in Computer Science, vol. 11647, Springer, Cham 2019; pp. 244-250

2. Pavel Exner: Spectral optimization for singular Schrödinger operators, to appear in Proceedings of the conference "Differential Operators on Graphs and Waveguides" (Graz 2019)

3. Pavel Exner: Topologically induced spectral behavior: the example of quantum graphs, to appear in Proceedings of the "8th International Congress of Chinese Mathematicians" (Beijing 2019)

4. Pavel Exner: Dirac operators with a δ-shell interaction, to appear in Proceedings of the International Bogolyubov Conference "Problems of Theoretical and Mathematical Physics" (Moscow and Dubna 2019)

5. Pavel Exner, Sylwia Kondej: Scattering on leaky wires in dimension three, to appear in "Analysis and Operator Theory – In Honor of Tosio Kato's 100th Birthday" (Th. Rassias and V. Zagrebnov, eds.), Springer Optimization and Its Applications, vol. 146, Cham 2019; pp. 81-91.

6. Václav Košík, Štepán Starosta: On substitutions closed under derivation: examples, in "Combinatorics on Words (WORDS 2019)" (R. Mercas, D. Reitenbach, eds.), Lecture Notes in Computer Science, vol. 11682, Springer, Cham 2019; pp. 226-237

7. Kateřina Medková: Derived sequences of Arnoux–Rauzy sequences, in "Combinatorics on Words (WORDS 2019)" (R. Mercas, D. Reitenbach, eds.), Lecture Notes in Computer Science, vol. 11682, Springer, Cham 2019; pp. 251-263

8. Josef Rukavička: Rich words containing two given factor, in "Combinatorics on Words (WORDS 2019)" (R. Mercas, D. Reitenbach, eds.), Lecture Notes in Computer Science, vol. 11682, Springer, Cham 2019; pp. 286-298

9. Miloslav Znojil: Three-Hilbert-space formulation of quantum theory: unitary evolution via non-Hermitian Hamiltonians, in "Topics in Quantum Physics and Path Integrals" (E. Bounames and A. Makhlouf, eds.), ISTE-Wiley Editions 2019; pp. 79-126.

10. Miloslav Znojil: On some aspects of unitary evolution generated by non-Hermitian Hamiltonians (a unitary way towards quantum collapse), in "Integrability, Supersymmetry and Coherent States, A Volume in Honour of Professor Véronique Hussin" (S. Kuru, J. Negro, L.M. Nieto, eds.), CRM Series in Mathematical Physics, Springer International Publishing 2019, pp. 411-426.

(d) Submitted in 2019, not yet accepted

1. Petr Ambrož, Zuzana Masáková, Edita Pelantová: Morphisms generating antipalindromic words (arXiv:1906.06174 [math.CO])

2. Marzieh Baradaran, Pavel Exner, Miloš Tater: Ring chains with vertex coupling of a preferred orientation (arXiv:1912.03667 [math.SP])

3. Diana Barseghyan, Pavel Exner: Spectral geometry in a rotating frame: properties of the ground state (arXiv:1902.03038 [math.SP])

4. Philippe Briet, Jaroslav Dittrich, David Krejčiřík: Spectrum absolute continuity in a twisted Dirichlet-Neumann waveguide (arXiv:1906.05617 [math-ph])

5. Biagio Cassano, Orif O. Ibrogimov, David Krejčiřík, František Štampach: Location of eigenvalues of non-self-adjoint discrete Dirac operators (arXiv:1910.10710 [math.SP]]

6. Alonso Contreras-Astorga, Vít Jakubský, Alfredo Raya: On the propagation of Dirac fermions in graphene with the strain-induced inhomogeneous Fermi velocity (arXiv:1912.00675 [cond-mat.mes-hall])

7. Jaroslav Dittrich: Scattering of particles bounded to infinite planar curve (arXiv:1912.03958 [math-ph])

8. Felix Fournier, Libor Šnobl, Pavel Winternitz: Cylindrical type integrable classical systems in a magnetic field (arXiv:1909.05307 [math-ph])

9. Pedro Freitas, Jiří Lipovský: A Gelfand-Levitan trace formula for generic quantum graphs (arXiv:1901.07790 [math-ph])

10. Dirk Hundertmark, Michal Jex, Markus Lange: Quantum systems at the brink. Existence and decay rates of bound states at thresholds; atoms (arXiv:1908.05016 [math-ph])

11. Dirk Hundertmark, Michal Jex, Markus Lange: Quantum systems at the brink. Existence and decay rates of bound states at thresholds; helium (arXiv:1908.04883 [math-ph])

12. Tomáš Kalvoda, David Krejčiřík, Kateřina Zahradová: Effective quantum dynamics on the Möbius strip (arXiv:1912.05365 [math-ph])

13. Magda Khalile, Vladimir Lotoreichik: Spectral isoperimetric inequalities for Robin Laplacians on 2-manifolds and unbounded cones (arXiv:1909.10842 [math.SP])

14. Antonella Marchesiello, Libor Šnobl: Classical superintegrable systems in a magnetic field that separate in Cartesian coordinates (arXiv: 1911.01180 [math-ph])

15. Jan Mareš, Jaroslav Novotný, Martin Štefaňák, Igor Jex: A counterintuitive role of geometry in transport by quantum walks (arXiv:1908.10173 [quant-ph])

16. Zuzana Masáková, Jan Mazáč, Edita Pelantová: On generalized self-similarities of cut-and-project sets (arXiv:1909.10753 [math-ph])

17. Zuzana Masáková, Tomáš Vávra, Francesco Veneziano: Finiteness and periodicity of continued fractions over quadratic number fields (arXiv:1911.07670 [math.NT])

18. Edita Pelantová, Štěpán Starosta: On Sturmian substitutions closed under derivation (arXiv:1908.11095 [math.DS])