Brief bibliography for GEMSTONE mini-course Montreal 29 August — 2 September, 2002

Michael Levitin

Most of the material covered in the course will be included in the forthcoming book

M. Levitin, D. Mangoubi, and I. Polterovich (202?) *Topics in Spectral Geometry*.

Other sources, either mentioned in the lectures, or otherwise recommended, include the following texts (which in many cases cite further useful literature) , very loosely split by parts of my slides.

Part 0. Definitions and Basics

E. B. Davies (1995) *Spectral Theory and Differential Operators*. Cambridge Studies in Advanced Mathematics **42**. Cambridge University Press, Cambridge, 1995. doi: 10.1017/CBO9780511623721.

M. Shubin (2020) *Invitation to Partial Differential Equations*, edited by M. Braverman, R. McOwen, and P. Topalov. Graduate Studies in Mathematics **205**. American Math. Soc., Providence, RI.

B. Helffer (2013) *Spectral Theory and its Applications*. Cambridge University Press, Cambridge. doi: 10.1017/CBO9781139505727.

Part 1. Method of multipliers

M. Levitin and L. Parnovski (2002) *Commutators, spectral trace identities, and universal estimates for eigenvalues*, J. Funct. Anal. **192**:2, 425–445. doi: 10.1006/jfan. 2001.3913.

E. M. Harrell, II and J. Stubbe (1997) *On trace identities and universal eigenvalue estimates for some partial differential operators*, Trans. Amer. Math. Soc. **349**:5, 2037–2055. doi: 10.1090/S0002-9947-97-01846-1.

B. Colbois, A. Girouard and A. Hassannezhad (2020) *The Steklov and Laplacian spectra of Riemannian manifolds with boundary*, J. Funct. Anal. **278**:6, 108409. doi: 10.1016/j.jfa.2019.108409.

S. N. Chandler-Wilde, I. G. Graham, S. Langdon, and E. A. Spence (2012) *Numerical-asymptotic boundary integral methods in high-frequency acoustic scattering*, Acta Numerica **21**, 89–305. doi: 10.1017/S0962492912000037.

L. Hörmander (1954) *Uniqueness theorems and estimates for normally hyperbolic partial differential equations of the second order*, in *Tolfte Skandinaviska Matematikerkongressen*, Lunds Universitets Matematiska Institution, 105–115.

L. Hörmander (2018) *Inequalities between normal and tangential derivatives of harmonic functions*, in: *Unpublished manuscripts*, 37–41. Springer International Publishing. doi: 10.1007/978-3-319-69850-2_6

S. I. Pohožaev (1965) *On the eigenfunctions of the equation* $\Delta u + \lambda f(u) = 0$, Soviet Math. Dokl **6**, 1408–1411.

F. Rellich (1940) *Darstellung der Eigenwerte von* $\Delta u + \lambda u$ *durch ein Randintegral*, Math. Z. **46**, 635–636. doi: 10.1007/BF01181459.

Part 2. Applications of the method of multipliers

A. Girouard, M. Karpukhin, M. Levitin, and I. Polterovich (2022) *The Dirichlet-to-Neumann map, the boundary Laplacian, and Hörmander's rediscovered manuscript*, J. Spectr. Theory **12**:1, 195–225. doi: 10.4171/JST/399.

L. Provenzano and J. Stubbe (2019) *Weyl-type bounds for Steklov eigenvalues*, J. Spectr. Theory **9**:1, 349–377. doi: 10.4171/JST/250.

L. Friedlander (1991) *Some inequalities between Dirichlet and Neumann Eigenvalues*, Arch. Rational Mech. Anal. **116**:2, 153–160. doi: 10.1007/BF00375590.

W. Arendt and R. Mazzeo (2012) *Friedlander's eigenvalue inequalities and the Dirichlet-to-Neumann semigroup*, Commun. Pure Appl. Anal. **11**:1, 2201–2212. doi: 10.3934/cpaa.2012.11.2201.

N. Filonov (2004) *On an inequality between Dirichlet and Neumann eigenvalues for the Laplace operator*, Algebra i Analiz **16**:2, 172–176 (Russian). English translation St. Petersburg Math. J. **16**:2 (2005), 413–416. doi: 10.1090/S1061-0022-05-00857-5.

A. Hassannezhad and D. A. Sher (2022) *Nodal count for Dirichlet-to-Neumann operators with potential*, Proc. AMS. doi: 10.1090/proc/16207.

A. Hassell and T. Tao (2002) *Upper and lower bounds for normal derivatives of Dirichlet eigenfunctions*, Math. Res. Lett. **9**:2–3, 289–305. doi: 10.4310/MRL.2002.v9.n3.a6.

Z. Rudnick, I. Wigman, and N. Yesha (2021) *Differences between Robin and Neumann eigenvalues*, Commun. Math. Phys. **388**, 1603–1635. doi: 10.1007/s00220-021-04248-y.

A. Hassannezhad and A. Siffert (2020) *A note on Kuttler–Sigillito's inequalities*, Ann. Math. Qué. **44**:1, 125–147. doi: 10.1007/s40316-019-00113-6.

Part 3. Spectral asymptotics for the DtN map $\mathscr{D}_0$

G. V. Rozenblyum (1986) *On the asymptotics of the eigenvalues of certain two-dimensional spectral problems*, Sel. Math. Sov. **5**:3, 233–244.

J. Edward (1993) *An inverse spectral result for the Neumann operator on planar domains*, J. Func. Anal. **111**:2, 312–322. doi: 10.1006/jfan.1993.1015.

M. Karpukhin, J.Lagacé, and I. Polterovich (2022) *Weyl's law for the Steklov problem on surfaces with rough boundary*, arXiv: 2204.05294.

A. Girouard and I. Polterovich (2017) *Spectral geometry of the Steklov problem*, J. Spectr. Theory **7**:2, 321–359. doi: 10.4171/JST/164.

Part 4. Asymptotics of Steklov eigenvalues in curvilinear polygons

M. Levitin, L. Parnovski, I. Polterovich, and D. A. Sher (2021) *Sloshing, Steklov and corners: Asymptotics of sloshing eigenvalues*, J. d'Anal. Math. **146**, 65–125. doi: 10.1007/s11854-021-0188-x.

M. Levitin, L. Parnovski, I. Polterovich, and D. A. Sher (2022) *Sloshing, Steklov and corners: Asymptotics of Steklov eigenvalues for curvilinear polygons*, Proc. LMS. doi: 10.1112/plms.12461.

G. Berkolaiko (2017) *An elementary introduction to quantum graphs*, in *Geometric and Computational Spectral Theory*, Contemporary Mathematics **700**, American Mathematical Society, Providence, RI, and Centre de Recherches Mathématique, Montréal, Québec, 41–72. doi: 10.1090/conm/700/14182.

G. Berkolaiko and P. Kuchment (2013) *Introduction to quantum graphs*. Mathematical Surveys and Monographs **186**. American Mathematical Society, Providence, RI. doi: 10.1090/surv/186.

V. Ivrii (2019) *Spectral asymptotics for Dirichlet to Neumann operator in the domains with edges*, in *Microlocal Analysis, Sharp Spectral Asymptotics and Applications V*, Springer, Cham, 513–539. doi: 10.1007/978-3-030-30561-1_31.

A. Girouard, J. Lagacé, I. Polterovich, and A. Savo (2019) *The Steklov spectrum of cuboids*, Mathematica **65**:2, 272–310. doi: 10.1112/S0025579318000414.

J. Mayrand, C. Senécal, and S. St-Amant (2021) *Asymptotics of sloshing eigenvalues for a triangular prism*, Math. Proc. Camb. Phil. Soc. doi: 10.1017/S0305004121000712

M. Khalile (2018) *Spectral asymptotics for Robin Laplacians on polygonal domains*, J. Math. Anal. Appl. **461**:2, 1498–1543. doi: 10.1016/j.jmaa.2018.01.062.

M. Khalile and K. Pankrashkin (2018) *Eigenvalues of Robin Laplacians in infinite sectors*, Math. Nachr. **291**:5–6, 928–965. doi: 10.1002/mana.201600314.

Part 5. Inverse Steklov problems

S. Krymski, M. Levitin, L. Parnovski, I. Polterovich, and D. A. Sher (2021) *Inverse Steklov spectral problem for curvilinear polygons*, Int. Math. Res. Not. **2021**:1, 1–37. doi: 10.1093/imrn/rnaa200.

A. Girouard, L. Parnovski, I. Polterovich, and D. A. Sher (2014) *The Steklov spectrum of surfaces: asymptotics and invariants*, Math. Proc. Cambridge Philos. Soc. **157**:3, 379–389. doi: 10.1017/S030500411400036X.

P. Kurasov and R. Suhr (2020) *Asymptotically isospectral quantum graphs and generalised trigonometric polynomials*, J. Math. Anal. Appl. **488**:1, 124049. doi: 10.1016/j.jmaa.2020.124049.