

Bachelorseminar “Analysis”

Ben Schweizer, TU Dortmund, Winter 2024/25

1.10.2024

Ort und Zeit unserer Treffen: *Mittwoch 10:15–11:45, Raum 611*

Themen

1. Kompakte Operatoren und Fredholmoperatoren [Kab18], A.B. geplant: 30.11.24
2. Spektralsatz für kompakte normale Operatoren [Kab18], F.R. geplant: 13.11.24
3. Rektifizierbare Kurven [Leo09] ab S. 133, L.B. geplant: 20.11.24
4. Isoperimetrische Ungleichung [Bär10], E.L. geplant: 27.11.24
5. Der Fixpunktsatz von Brouwer [Kab99], Kap. 21, [Eva10], Kap. 8.1, R.K. geplant: 4.12.24
6. Helmholtz Zerlegungen und Vektorpotentiale [ABDG98], [GR79], [Sch18], Skript auf Homepage von B.Schweizer, M.M. geplant: 11.12.24
7. Floquet-Bloch Transformation. Eine Quelle: Kirsch A and Schweizer B (2024), ”Periodic wave-guides revisited: Radiation conditions, limiting absorption principles, and the space of bounded solutions”. H.T. geplant: 18.12.24

References

- [ABDG98] C. Amrouche, C. Bernardi, M. Dauge, and V. Girault. Vector potentials in three-dimensional non-smooth domains. *Math. Methods Appl. Sci.*, 21(9):823–864, 1998.
- [Bär10] Christian Bär. *Elementare Differentialgeometrie*. Walter de Gruyter & Co., Berlin, expanded edition, 2010.
- [Eva10] Lawrence C. Evans. *Partial differential equations*, volume 19 of *Graduate Studies in Mathematics*. American Mathematical Society, Providence, RI, second edition, 2010.
- [GR79] V. Girault and P.-A. Raviart. *Finite element approximation of the Navier-Stokes equations*, volume 749 of *Lecture Notes in Mathematics*. Springer-Verlag, Berlin-New York, 1979.
- [Kab99] Winfried Kaballo. *Analysis III*. Hochschultaschenbuch. Spektrum, 1999.
- [Kab18] Winfried Kaballo. *Grundkurs Funktionalanalysis*. Springer, 2018.
- [Leo09] Giovanni Leoni. *A first course in Sobolev spaces*, volume 105 of *Graduate Studies in Mathematics*. American Mathematical Society, Providence, RI, 2009.
- [Sch18] Ben Schweizer. On Friedrichs inequality, Helmholtz decomposition, vector potentials, and the div-curl lemma. In *Trends in applications of mathematics to mechanics*, volume 27, pages 65–79. Springer, Cham, 2018.