

Themen des Proseminars „Maßtheorie und Funktionalanalysis“

1. Stone-Weierstrass theorem and its applications [4, 6, 7, 17, 20]
2. Baire's category theorem and its applications [3, 20, 24, 27, 28]
3. L^p -spaces and their duals [1, 3, 6, 19, 24]
4. Weak topologies on Banach spaces and applications [3, 4, 20, 28]
5. Fixed point theorems and their applications [4, 7, 9, 27]
6. Pointwise convergence and non-convergence of Fourier series [5, 21, 29]
7. Hausdorff measure and Hausdorff dimension with applications to fractal geometry [8, 12, 15, 23]
8. Linear functionals on continuous functions and Riesz(-Markov-Kakutani) representation theorem [4, 13, 19, 24]
 - Advanced related topic: Daniell-Stone integrals and their applications [6]
9. Absolutely continuous functions and Lebesgue's differentiation theorem [6, 19, 23]
10. Fourier transform and its applications to differential equations [5, 19, 20, 21, 29]
11. Sobolev spaces and Sobolev embedding theorem [1, 3, 9]
12. Harmonic functions and the Dirichlet problem for Laplace's equation [2, 10, 11]
13. Optimal transport problem [14, 25, 26]

References

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