

References¹

- [AIN1] Alimov, Sh.A., Il'in, V.A., Nikishin, E.M.: Questions on the convergence of multiple trigonometric series and spectral expansions. I. *Usp. Mat. Nauk* **31**(6), 28–83 (1976). **10.4.8**
- [AIN2] Alimov, A.Sh.A., Il'in, V.A., Nikishin, E.M.: Questions on the convergence of multiple trigonometric series and spectral expansions. II. *Usp. Mat. Nauk* **32**(1), 107–130 (1977). **10.4.8**
- [Ar] Artin, E.: *The Gamma Function*. Holt, Rinehart and Winston, New York (1964). **7.2.5**
- [B] Benedicks, M.: On Fourier transforms of functions supported on sets of finite Lebesgue measure. *J. Math. Anal. Appl.* **106**, 180–183 (1985). **10.6.3**
- [Bo] Bogachev, V.I.: *Measure Theory*, vols. 1, 2. Springer, Berlin (2007). **1.1.3, 1.5.1, 4.8.7**
- [Bol] Boltyansky, V.G.: *Curve Length and Surface Area*. Encyclopaedia of Elementary Mathematics. Geometry, vol. 5. Nauka, Moscow (1966) [in Russian]. **8.8.5**
- [B-I] Borisovich, Yu.G., Bliznyakov, N.M., Fomenko, T.N., Izrailevich, Ya.A.: *Introduction to Topology*. Mir, Moscow (1985)
- [Bou] Bourbaki, N.: *General Topology*. Chapters 5–10. Springer, Berlin (1989). **1.1.3**
- [BZ] Burago, Yu.D., Zalgaller, V.A.: *Geometric Inequalities*. Springer, Berlin (1988). **2.8.1**
- [C] Carleson, L.: On the convergence and growth of partial sums of Fourier series. *Acta Math.* **116**, 135–157 (1966). **10.3.9**
- [Ca] Cartan, H.: *Elementary Theory of Analytic Functions of One or Several Complex Variables*. Dover, New York (1995). **10.3.8**
- [CI] Chamizo, F., Iwaniec, H.: On the sphere problem. *Rev. Mat. Iberoam.* **11**(2), 417–429 (1995). **10.6.6**
- [Ch] Chernoff, P.R.: Pointwise convergence of Fourier series. *Am. Math. Mon.* **87**(5), 399–400 (1980). **10.3.4**
- [EF] Erdős, P., Fuchs, W.H.J.: On a problem of additive number theory. *J. Lond. Math. Soc.* **31**, 67–73 (1956). **10.2.1, 10.6.6, 10.6 (Ex. 9)**
- [EG] Evans, L.C., Gariepy, R.F.: *Measure Theory and Fine Properties of Functions*. CRC Press, Boca Raton (1992). **6.2.1, 8.4.2, 8.4.5**
- [F] Federer, H.: *Geometric Measure Theory*. Springer, New York (1969). **2.8.1, 8.2.2, 8.4.4, 8.8.1, 10.3 (Ex. 5), 13.2.3**
- [Fi] Fichtenholz, G.M.: *Differential and Integral Calculus*, vols. I–III. Nauka, Moscow (1970) [in Russian]. **7.4.3**
- [GO] Gelbaum, B.R., Olmsted, J.M.H.: *Counterexamples in Analysis*. Holden-Day, San Francisco (1964). **5.2.2**

¹The numbers of sections where the reference is mentioned are represented in bold.

- [G] Greenleaf, F.P.: Invariant Means on Topological Groups and Their Applications. Van Nostrand Reinhold, New York (1969). **2.4.3**
- [H] Halmos, P.R.: Measure Theory. Van Nostrand, New York (1950). **Preface**
- [HR] Hardy, G.H., Rogosinski, W.W.: Fourier Series. Cambridge University Press, Cambridge (1950). **10.3 (Ex. 5)**
- [LK] Hua, L.-K.: Abschätzungen von Exponentialsummen und ihre Anwendung in der Zahlentheorie. Teubner Verlagsgesellschaft, Leipzig (1959). **10.6.6**
- [JW] Jessen, B., Wintner, A.: Distribution functions and the Riemann zeta function. Trans. Am. Math. Soc. **38**(1), 48–88 (1935). **10.3.6**
- [Ke] Kendall, D.G.: On the number of lattice points inside a random oval. Q. J. Math. Oxf. Ser. **19**, 1–26 (1948). **10.6.7**
- [Ko] Koldobsky, A.: Fourier Analysis in Convex Geometry. Am. Math. Soc., Rhode Island (2005). **6.7.1**
- [KF] Kolmogorov, A.N., Fomin, S.V.: Elements of the Theory of Functions and Functional Analysis, vols. 1, 2. Graylock Press, Rochester (1957). Albany, N.Y. (1961). **Preface**
- [L] Lebesgue, H.: Lectures on Integration and Analysis of Primitive Functions. Cambridge University Press, Cambridge (2009). **Chap. 4**
- [Li] Littlewood, J.E.: A Mathematician's Miscellany. Methuen, London (1953). **7.6.4**
- [LO] Leipnik, R., Oberg, R.: Subvex functions and Bohr's uniqueness theorem. Am. Math. Mon. **74**, 1093–1094 (1967). **7.2.8**
- [Luk] Lukacs, E.: Characteristic Functions. Hafner, New York (1970). **10.5.4**
- [Lus] Luzin, N.N.: Collected Works, vol. 2. Academy of Sciences, Moscow (1958) [in Russian]. **Chap. 4**
- [M] Matsuoka, Y.: An elementary proof of the formula $\sum_{k=1}^{\infty} \frac{1}{k^2} = \frac{\pi^2}{6}$. Am. Math. Mon. **68**, 486–487 (1961). **4.6.2**
- [Mi] Milnor, J.: Analytic proofs of the “hairy ball theorem” and the Brouwer fixed point theorem. Am. Math. Mon. **85**(7), 521–524 (1978). **6.6.1**
- [N] Natanson, I.P.: Theory of Functions of a Real Variable. Frederick Ungar, New York (1955/1961) **1.4.1, 2.4.3, Chap. 4**
- [Na] Nazarov, F.L.: The Bang solution of the coefficient problem. St. Petersburg Math. J. **9**(2), 407–419 (1998). **10.1.8**
- [NP] Nazarov, F.L., Podkorytov, A.N.: Ball, haagerup, and distribution functions. In: Complex Analysis, Operators, and Related Topics. Operator Theory: Advances and Applications, vol. 113, pp. 247–267. Birkhäuser, Basel (2000). **6.7.1**
- [PS] Pólya, G., Szegő, G.: Problems and Theorems in Analysis, vols. I, II. Springer, Berlin (1998). **10.3.5**
- [RN] Riesz, F., Sz.-Nagy, B.: Functional Analysis. Dover, New York (1990). **11.3.4**
- [R] Rogers, C.A.: A less strange version of Milnor's proof of Brouwer's fixed-point theorem. Am. Math. Mon. **87**(7), 525–527 (1980). **6.6.1**
- [RS] Rogers, C.A., Shephard, G.C.: The difference body of a convex body. Arch. Math. **8**, 220–233 (1957). **6.4.2**
- [S] Saks, S.: Theory of the Integral. Dover, New York (1964). **Preface, 2.7.4**
- [V] Vladimirov, V.S.: Equations of Mathematical Physics. Marcel Dekker, New York (1971). **8.7.9**
- [Vu] Vulikh, B.Z.: A Brief Course in the Theory of Functions of a Real Variable. Nauka, Moscow (1973) [in Russian]. **Preface**
- [Z] Zorich, V.A.: Mathematical Analysis, vols. I, II. Springer, Berlin (2004). **7.4.3**
- [Zy] Zygmund, A.: Trigonometric Series, vols. I, II. Cambridge University Press, New York (1959). **10.4.7**

Author Index¹

A

Abel, **4.6.6**, 7.4.5–7.4.7, 10.4.3, 10.4.7, 10.6.4
Ampère, **11.3.4**
Archimedes, 5.4.2, **8.6.6**

B

Ball, **6.7.1**, 6.7.3–6.7.5
Banach, **2.4.3**, 13.4.1, 13.4.3, 13.4.4, 13.6.1
Barrow, **4.6.1**, 4.9.1, 4.9.3, 13.1.2, 13.1.3
Bernoulli, **4.1.2**, 8.1.3, 10.2.6
Bernstein, **10.4** (Ex. 1)
Bessel, **10.1.2**, 10.1.3–10.1.6, 10.4.4, 10.5.2
Bieberbach, **2.8.3**
Binet, **2.5.3**, 8.3.4
Bochner, **13.6**, 13.6.1, 13.6.5–13.6.7
Boole, **6.4** (Ex. 6)
Borel, **1.1.3**, 2.3.3, 3.1.2, 3.1 (Ex. 7), 3.3.3,
3.3.4, 3.3.6, 3.3.7, 4.10.3, 4.10.5,
4.11.4, 6.4.1, 6.4 (Ex. 2), 7.5.5, 10.2.6,
10.2.8
Brouwer, 6.6, 6.6.1, **6.6.3**, 6.6.4, 6.6 (Ex. 1–3)
Brunn, **2.8.1**–2.8.3, 2.8 (Ex. 3), 6.4.2, 13.4.8
Bunyakovsky, **4.4.5**, 8.7.11, 10.1.1, 10.1.8,
10.5.9
Busemann, **6.7.1**

C

Cantelli, **3.3.3**, 3.3.4, 3.3.6, 3.3.7
Cantor, 1.1.3, **2.1.4**, 2.3.2, 2.3 (Ex. 2, 5), 4.7.3,
10.3
Carathéodory, **1.4.1**, 1.4.4, 1.4.5, 13.6.6
Carleson, **10.3.9**, 10.4.6
Catalan, **6.4** (Ex. 2)
Cauchy, **2.5.3**, 4.4.4, 4.7.2, 4.8.5, 7.1.7, 8.3.4,
8.6.7, 8.7.11, 10.1.1, 10.1.8, 10.5.9

Cavalieri, **5.2.2**, 5.4.2, 5.6.1, 11.4.2, 13.4.7
Cesàro, **10.4.1**, 10.4.3, 10.4 (Ex. 7), 12.3.6,
12.3 (Ex. 3, 5)
Chebyshev, **4.4.4**, 4.8.3, 4.9.2, 5.3 (Ex. 5),
6.4.3, 9.3.4, 10.2 (Ex. 2)

D

Denjoy, **10.3.10**
Dini, **10.3.4**–10.3.6, 10.3 (Ex. 3, 4, 9),
10.5.3–10.5.5, 12.2.9
Dirac, **7.5.1**, 7.6.1
Dirichlet, 3, 3.1.7, 3.2.2, 3.2 (Ex. 6), **4.6.6**,
7.4.6–7.4.8, 8.7, 8.7.9, 8.7.10, 8.7.12,
8.7.13, 9.3 (Ex. 3), 10.3.3, 10.3.4,
10.3.6, 10.3.7, 10.3 (Ex. 4), 10.4.1,
10.4.2, 10.4.4, 10.4.5, 10.4.8,
10.4 (Ex. 3), 10.5.3, 10.5.10

E

Egorov, **3.3.6**, 3.3 (Ex. 10), 3.4.3, 8.8.5
Euler, 4.6.2, **4.6.3**, 4.6 (Ex. 7, 8), 5.3.2, 5.4.2,
5.4.3, 6.2.4, 6.4.2, 7.2, 7.2.1, 7.2.3,
7.2.5–7.2.7, 7.2 (Ex. 2), 7.6.4,
8.7 (Ex. 6), 10.2.1, 10.3.5, 10.5.1,
10.6.1

F

Fatou, **4.8.6**, 4.8.7, 4.8 (Ex. 5), 9.1.3, 10.5.7,
10.5 (Ex. 7), 12.1.1
Federer, **8.4.2**
Fefferman, **10.4.6**
Fejér, 10.3.6, **10.4.1**–10.4.3, 10.4.5, 10.4.7,
10.4 (Ex. 1, 2), 12.3.6
Fischer, **10.1.4**–10.1.6

¹The numbers of sections containing footnotes with biographical data are represented in bold.

Fourier, 4.6.2, 6.2.5, 6.7.2, **10.1.3**–10.1.8,
 10.1 (Ex. 6), 10.2.1–10.2.3,
 10.3.1–10.3.10, 10.3 (Ex. 2, 8–10, 14),
 10.4.1–10.4.8, 10.4 (Ex. 2, 4, 8–10),
 10.5.1–10.5.6, 10.5.8–10.5.10,
 10.5 (Ex. 1, 4, 6), 10.6.1–10.6.5, 10.6.7,
 11.1.9, 12.3.3, 12.3.6, 12.3 (Ex. 5)

Fréchet, **3.4.2**, 3.4.3

Fresnel, **4.6.4**, 4.6.5, 7.4.8, 9.2.5

Frullani, **4.6** (Ex. 15)

Fubini, **5.3.3**–5.3.5, 6.2.4, 6.4.2, 6.7.2, 7.1.1,
 7.4.4, 8.4.2, 8.6.1, 8.6.3, 10.1.7, 10.5.2,
 10.5.3, 10.5.5, 10.5.7, 11.3.3, 13.6.5,
 13.6.6

G

Gagliardo, **5.4.4**, 8.4.5

Gauss, **7.2.3**, 7.2.7, 8.6.1, 8.6.3–8.6.7,
 8.7.1–8.7.3, 8.7.10, 8.7 (Ex. 4), 8.8.4,
 9.3.5, 10.6.5, 10.6.6

Gram, **2.5.3**, 2.5.4, 8.3.4, 8.3.5

Green, 8.5.4, **8.6.7**, 8.7.2, 8.7.9, 8.7.10, 8.7.13,
 10.2.1

Guldin, **6.3** (Ex. 2), 8.3 (Ex. 2)

H

Hadamard, **2.5.4**, 7.4.10, 13.7.8

Hahn, **11.1.7**, 13.4.1, 13.4.3, 13.4.4

Hardy, **4.9.1**, 10.6.6

Harnack, **8.7.11**, 8.7 (Ex. 13, 15)

Hausdorff, 1.4.1, **2.6.1**–2.6.4, 2.8.2, 8.2.2,
 8.3.3, 8.6.4, 8.7, 8.8.1, 8.8.5, 9.3.5,
 11.3.6, 11.3 (Ex. 3), 13.4.5, 13.4.6,
 13.4 (Ex. 4)

Hermite, **10.2.4**, 10.5.6

Hesse, **7.3.7**

Hölder, **4.4.5**, 4.4.6, 5.4.4, 6.4.5, 6.7.3, 6.7.4,
 7.2.8, 9.1.1, 9.3.1–9.3.3, 12.1.1

Hurwitz, **10.2.1**

J

Jacobi, **6.2.1**, 6.2.3, 6.5.1, 6.5.3, 6.6.1, 8.1.1,
 8.1.4, 8.6.6, 10.6.1, 13.7.1

Jensen, **13.4.3**, 13.4.4

John, 2.5.5

Jordan, **10.3.4**, 10.3.6, 10.3 (Ex. 4), 10.5.3,
 11.1.7–11.1.9

K

Kakutani, **12.2.2**, 12.2.4, 12.2.7–12.2.9, 12.3.5

Khintchine, **6.4.5**, 9.1 (Ex. 7), 10.2 (Ex. 6)

Kolmogorov, **10.2.7**, 10.3.3

Kronrod, **8.4.2**

L

Lagrange, **7.1.5**, 7.1.7, 7.3.5, 7.6.4, 8.3.2,
9.3.6, 9.3 (Ex. 5), 11.4.2, 13.5.1, 13.7.2

Laguerre, **10.2** (Ex. 3), 10.5.6

Landau, **10.6.6**

Laplace, 6.7.3, 7.1.7, **7.3.1**–7.3.8, 7.4.8,
 7.4 (Ex. 3), 8.7.1, 8.7.9, 8.7 (Ex. 2),
 10.5.3

Lebesgue, **1.4.1**, 1.4.4, 2.1.2, 2.1.3,
 2.2.1–2.2.3, 2.3.1–2.3.3, 2.3 (Ex. 3, 6),
 2.4.1–2.4.6, 2.5.1–2.5.3, 2.5 (Ex. 1, 3),
 2.6.1, 2.6.4, 2.6.6, 2.6 (Ex. 8), 2.7.1,
 2.8.1, 3.1.2, 3.1.7, 3.1 (Ex. 1, 3, 6),
 3.3.1, 3.3.2, 3.3.4, 3.3.6, 3.3.7,
 3.3 (Ex. 2, 3, 12), 3.4.1–3.4.3, 4.5.4,
 4.6.1, 4.6.4, 4.7.1–4.7.3, 4.8.2–4.8.7,
 4.8 (Ex. 3, 5), 4.9.1–4.9.3, 4.9 (Ex. 3),
 4.10.1, 4.10.3–4.10.5, 4.10 (Ex. 5, 6),
 4.11.3, 4.11.4, 5.1.3, 5.2.2, 5.2.3,
 5.2 (Ex. 1), 5.3.2–5.3.5, 5.3 (Ex. 3),
 5.4.1, 5.4.2, 5.4 (Ex. 11), 5.5.2,
 5.5 (Ex. 1), 6.1.1, 6.1 (Ex. 2–4), 6.2.1,
 6.2.2, 6.4.5, 6.4 (Ex. 1), 6.5.1–6.5.3,
 6.5 (Ex. 1), 6.7.1, 7.1.2, 7.3.4, 7.3.7,
 7.4.1, 7.4.4, 7.5.1, 7.5.5, 7.6.1, 8.1.1,
 8.2.1, 8.2.2, 8.3.1–8.3.3, 8.3.6, 8.3.7,
 8.4.1, 8.6.1, 8.7.10, 8.8.1, 8.8.3, 8.8.5,
 9.1.1, 9.1.2, 9.1 (Ex. 2), 9.2.1, 9.2.2,
 9.2.4, 9.2.5, 9.2 (Ex. 2, 7), 9.3.4, 9.3.5,
 9.3 (Ex. 4), 10.1 (Ex. 2), 10.3.1–10.3.4,
 10.3.6, 10.3.7, 10.3.10, 10.3 (Ex. 1),
 10.4.4, 10.5.1–10.5.7; 11.1.8, 11.2.1,
 11.2.3, 11.2 (Ex. 4), 11.3.1–11.3.4,
 11.3 (Ex. 1), 11.4.1, 11.4.2, 12.1.2,
 13.3.1, 13.3.2, 13.4.5, 13.5.1, 13.5.2,
 13.6.1, 13.6.2–13.6.7, 13.6 (Ex. 4)

Legendre, **7.2.4**–7.2.7, 7.3.8, 10.2.4

Leibniz, **4.1.2**, 4.6.1, 4.6.2, 4.9.3, 7.1.5, 7.1.6,
 7.3.5, 7.4.4, 7.4.5, 7.4.8, 7.4 (Ex. 1),
 7.5.4, 8.5.2, 8.6.1, 8.6.3, 10.5.2, 10.5.6,
 13.1.3, 13.1.4

Levi, **4.2.2**, 4.2.3, 4.2.5, 4.5.1, 4.5.3,
 4.8.2–4.8.4, 4.8.6, 4.8 (Ex. 2, 4), 5.1.2,
 5.2.3, 5.3.1, 6.1.1, 8.4.2, 10.5.7, 11.2.1,
 12.1.3, 12.2.9

Lindelöf, **8.1.5**, 13.5.2

Liouville, **5.4.3**, 6.1.3, 6.2.6, 8.7.5, 8.7.11,
 8.7.13

Lipschitz, **2.3.1**–2.3.3, 2.3 (Ex. 5, 6), 2.6.2,
 2.6 (Ex. 4), 4.6.1, 4.11.1, 4.11 (Ex. 4),
 6.5.4, 6.6.1, 8.1.2, 8.1.4, 8.3.2, 8.4.1,
 8.8.1–8.8.5, 10.3.8, 10.3 (Ex. 10),
 10.4.1, 10.4.5, 10.6.2, 10.6 (Ex. 3),

11.4.1, 11.4.2, 13.2.3, 13.4.2–13.4.4,
13.7.2
Littlewood, **4.9.1**
Lorenz, **6.2.6**
Luzin, **2.3.1**, 3.1.7, 3.4.3, 10.3.10

M

Marcinkiewicz, **9.1.4**
Maxwell, **8.3.5**, 8.5.1
Minkowski, **2.8.1**–2.8.3, 2.8 (Ex.3), 4.4.6,
6.4.2, 8.4.4, 9.1.1, 13.4.7, 13.4.8
Möbius, **8.5.3**
Morse, 7.4.11, **13.7.8**

N

Nazarov, **10.1.8**, 10.3.5
Newton, **4.6.1**, 4.6.2, 4.9.3, 7.3.4, 8.5.2, 8.6.1,
13.1.3, 13.1.4
Nikodym, **11.2.1**, 11.2.2, 11.2 (Ex. 2), 11.4.1
Nirenberg, **5.4.4**, 8.4.5

O

Ostrogradsky, **8.6.1**, 8.6.3–8.6.7, 8.7.1, 8.7.2,
8.8.4, 9.3.5

P

Parseval, **10.1.5**, 10.2.1, 10.2.2, 10.3.5, 10.3.6,
10.4 (Ex. 7), 10.5.1, 10.6.6, 10.6.7
Pascal, **8.6.6**
Petty, **6.7.1**
Plancherel, **10.5.7**–10.5.10
Poincaré, **6.1.3**, 8.3.5, 8.5.2, 8.7.8
Poisson, **4.6.3**, 4.6 (Ex. 8), 5.3.2, 5.4.2, 6.2.4,
6.4.2, 7.2.1, 7.6.4, 8.4 (Ex. 5), 8.7.4,
8.7.10, 8.7.11, 8.7.13, 9.3 (Ex. 2),
10.4.3, 10.4.7, 10.5.1, 10.6.1–10.6.5
Pythagoras, 2.5.3, 2.5.4, **10.1.2**, 10.1.6, 10.2.6

R

Rademacher, 3.1 (Ex. 8), **6.4.5**, 8.8.1, 8.8.3,
8.8.5, 9.1 (Ex. 7), 10.2.5, 10.2.6, 11.4.2,
13.4.3, 13.6 (Ex. 4)
Radon, **11.2.1**, 11.2.2, 11.2 (Ex. 2),
11.3.1–11.3.4, 11.3 (Ex. 1), 11.4.1,
12.1.3, 12.2.2, 12.2.4, 12.2.6, 12.2.9,
12.3.5, 13.3.1

Riemann, **4.8.5**, 8.6.7, 9.2.5, 9.2 (Ex. 7),
10.3.1–10.3.4, 10.3.10, 10.3 (Ex. 1),
10.4.6, 10.5.1–10.5.3, 13.1.1
Riesz, 3.3.1, **3.3.4**–3.3.6, 3.3 (Ex. 5), 4.8.6,
8.8.5, 10.1.4–10.1.6, 10.5.4, 12.2.2,
12.2.4, 12.2.7–12.2.9, 12.3.5, 13.6.5

S

Sard, 2.7 (Ex. 4), 8.4.3, 8.4.5, **13.5.1**, 13.5.2
Schwarz, **8.2.4**, 8.8.5, 10.3.9,
10.3 (Ex. 13, 14), 10.4.6, 13.4.6
Sierpiński, **5.2.2**, 10.6.6
Sobolev, **5.4.4**, 7.6.2, 8.4.5
Steklov, **7.6.2**
Stieltjes, **4.10.1**, 4.10.3–4.10.6, 4.10 (Ex. 6, 9),
4.11.4, 5.3.4, 6.4.1, 10.5.5, 11.3.4,
11.4.1
Stirling, 6.3.3, 6.4.5, 6.7.1, **7.2.6**, 7.2.7,
7.2 (Ex. 12, 14), 7.3.3
Suslin, **1.6.2**

T

Thomson, **8.7.10**, 8.7 (Ex. 9)
Tietze, 7.6.4, **13.2.2**, 13.2 (Ex. 2), 13.2.4
Tonelli, **5.3.1**–5.3.4, 5.3 (Ex. 2), 5.4.2, 5.4.3,
6.5.2, 7.3.7, 7.5.2, 8.3.7, 10.1.7, 13.6.5

U

Urysohn, 7.6.4, **13.2.2**, 13.2.4

V

de la Vallée-Poussin, **4.8.7**
Vitali, 2.6.5, **2.7.2**–2.7.4, 2.7 (Ex. 1, 4), 4.8.7,
4.9.2, 8.8.5, 11.3.1, 11.3.4

W

Wallis, **4.6.2**, 7.2.3
Walsh, **10.2.5**, 10.2.6
Watson, **7.3.5**
Weierstrass, 6.6.3, 6.6.4, 7.1.2, 7.1.3, **7.2.3**,
7.2.5, 7.6.4, 7.6.5, 9.2.3, 10.1.8, 10.3.8,
10.4.1, 10.5.4, 11.1.3, 11.3.4, 12.3.3,
12.3.6, 13.4.2

Y

Young, **9.3.2**

Subject Index

A

Abel–Poisson sums, 10.4.3, 10.6.4
Abel’s test, 4.6.6, 7.4.6
Absolute continuity
 of charge, 11.2.2
 of function, 4.9.3
 of the integral, 4.5.2
 of measure, 10.2.1
 equicontinuity of integrals, 4.8.7
Accompanying parallelepiped, 8.3.1
Additivity, countable, 1.3.1, 11.1.1
 finite, 1.2.1
Admissible function, 4.6.4
 partition, 3.2.1, 13.6.1
Affine subspace, 13.4.1
Algebra of sets, 1.1.2
 induced, 1.1.2
Almost everywhere, 4.3.1
 convergence, 3.3.1
Almost uniform convergence, 3.3.6
Antiderivative, 13.1.3
Approximate identity, 7.6.1
 periodic, 7.6.5
 Sobolev, 7.6.2
arc, rectifiable, 8.2.3
 simple, 8.2.3
Archimedes’ law, 8.6.6
Area, k -dimensional, 8.2.1
 Minkowski, 2.8.2

B

Ball’s inequality, 6.7.3, 6.7.5
Beam, upper, lower, 8.6.2
Barrow’s theorem, 4.6.1
Base of a cylinder set, 5.6.1
Basis, orthogonal, 10.1.5
Bending, 8.3.6

Bernstein’s inequality, 10.4 (Ex. 1)
Bessel’s inequality, 10.1.2, 10.1.3
Best approximation, 13.4.2
Beta function, 4.6.3, 5.3.2, 7.2.2
Bi-Lipschitz map, 8.8.1
Binet–Cauchy formula, 2.5.3
Bochner measurable function, 13.6.1
Borel hull, 1.1.3
 measure, 2.2.3
 set, 1.1.3
Borel–Cantelli lemma, 3.3.3
Borel–Stieltjes measure, 4.10.3
Bounded functional, 12.3.1
Brouwer fixed point theorem, 6.6.3
Brunn–Minkowski inequality, 2.8.1

C

Canonical parametrization, 8.1.3
 partition, 1.1.3
Cantor function, 2.3.2
 set, 2.1.4
Carathéodory extension of a measure, 1.4.5
Cauchy–Bunyakovsky inequality, 4.4.5
Cauchy theorem, 8.6.7
Cavalieri’s principle, 5.2.2, 5.4.1
Cell, 1.1.6
Center of mass, 6.3.3
Characteristic function, 3.1.2
Charge (real, complex), 11.1.1
Chebyshev’s inequality, 4.4.4
Codimension of a manifold, 8.1.1
Compactly supported function, 7.5.3, 12.2.1
Complete family of functions, 10.1.5
 measure, 1.4.3
Concave function, 13.4.3
Condition existence convolution, 7.5.1
Continuity in the mean, 9.2.4

- Continuity in the mean (*cont.*)
 of a measure, from above, from below,
 1.3.3, 1.3.4
 conditional, 1.3.4
 of a charge, from above, from below, 11.1.2
- Convergence almost everywhere, 3.3.1
 uniform, 3.3.6
 in measure, 3.3.1
 in the mean, 9.1.1
 pointwise, 3.1.4
 uniform, of an improper integral, 7.4.2
- Convex body, 2.5.5 13.4.1
 function, 13.4.3
 hull, 13.4.1
 polyhedron, 13.4.1
 set, 13.4.1
- Convolution of functions, 7.5.1
- Coordinate line, 6.2.3, 8.1.2
 neighborhood, 8.1.1
- Countable additivity, 1.3.1, 11.1.1
 subadditivity, 1.3.2, 1.4.2
- Counting measure, 1.3.1
- Cross sections of a set, 5.2.1
- Curve, 8.1.1
- Cylinder set, 5.6.1
- D**
- Decomposition Jordan, 11.1.7
 Hahn, 11.1.7
 Lebesgue, 11.2.3
- Density of a measure, 4.5.3
 of a charge with respect to a measure,
 11.1.6
 of an additive function, 6.3.1
 point, 2.7.3
- Derivative of a measure, 11.3.1
- Deviation in the mean, 9.1
- Diagonal sequence theorem, 3.3.7
- Diameter of a set, 1.1.6
- Diffeomorphism, 6.2 13.7.3
 theorem, 13.7.4
- Differential of a map, 13.7.1
- Dimension of a manifold, 8.1.1
- Dini's test, 10.3.4
- Dirichlet–Jordan test, 10.3.4
- Dirichlet kernel, 10.3.3, 10.4.5, 10.4.8
 problem, 8.7.9, 8.7.10, 8.7.13
 test, 4.6.6, 7.4.6
- Discrete measure, 1.3.1
- Disjoint decomposition lemma, 1.1.4
 union, 1.1.1
- Distance from a point to a set, 3.4.1, 13.2.1
- Distribution function (increasing, decreasing),
 6.4.1, 6.4.3
- Divergence, 8.6.6
- Dual space, 12.1.1
- E**
- \mathcal{E}_σ (\mathcal{E}_δ) set, 1.5.2
- Egorov's theorem, 3.3.6
- Epigraph of a function, 13.4.3
- ε -cover of a set, 2.6.1
- ε -neighborhood of a set, 2.6.3
- Equivalent functions, 4.3.2
- Ergodic map, 10.2.3
- Essential supremum, 4.4.5
- Essentially separably valued function, 13.6.6
- Euler–Gauss formula, 7.2.3
- Euler–Poisson integral, 4.6.3, 5.3.2, 6.2.4,
 6.4.2
- Euler's constant, 7.2.3
 reflection formula, 7.2.5
- Expanding map, 2.6.2
- F**
- F_σ set, 1.1.3
- Fatou's theorem, 4.8.6
- Fejér kernel, 10.4.1 10.4.7
 sums, 10.4.1, 10.4.7
 theorem, 10.4.1
- Filter, 1.1 (Ex. 12)
- Finite additivity, 1.2.1
 subadditivity, 1.2.3, 1.4.2
 volume, 1.2.2
- Fixed point, 6.6.3
- Flow of a vector field, 8.5.3
- Fourier coefficients of a function, 10.1.3,
 10.1.6, 10.2.1
 of a measure, 10.3.7
 of a charge, 11.1.9, 12.3.3
 integral, 10.5.3
 inversion formula, 10.5.3, 10.5.4
 series of a function, 10.1.3, 10.1.6, 10.2.1,
 10.3.1
 of a measure, 10.3.7
 of a charge, 11.1.9
 sums, 10.3.1
 transform, of a function, 6.2.5, 10.5.1,
 10.5.8
 of a measure, 10.5.5
- Fréchet's theorem, 3.4.2
- Fresnel integral, 4.6.4, 7.4.8
- Fubini's theorem, 5.3.3, 11.3.3, 11.3.5
- Function of bounded variation, 4.11.1
 almost surely separably valued, 13.6.6
- Functional, 4.2.5
 bounded, 12.3.1
 linear, 12.1

Functional (*cont.*)

- order continuous, 12.1.2
- positive, 12.2.2

Fundamental theorem of calculus, 4.6.1, 8.5.2, 13.1.3

G

G_δ set, 1.1.3

Gagliardo–Nirenberg–Sobolev inequality, 5.4.4, 8.4.5

Gamma function, 4.6.3, 5.3.2, 7.2.1–7.2.8, 7.3.2–7.3.8

Gauss–Ostrogradsky theorem, 8.6.5

Global parametrization, 8.1.1

Gram determinant, 2.5.3
matrix, 2.5.3

Graph of a function, 5.2.3

Green's function, 8.7.9

- identity, 8.6.7
- theorem, 8.7.2

H

Hadamard's inequality, 2.5.4
lemma, 13.7.8

Hahn–Banach theorem, 13.6.1

Hahn decomposition, 11.1.7

Harmonic conjugate, 8.7.8
function, 8.7.1

Harnack's inequality, 8.7.11

Hausdorff dimension, 2.6.6
measure, 2.6.3
metric, 8.8.5

Hermite functions, 10.2.4, 10.5.6
polynomials, 10.2.4

Hessian matrix, 7.3.7

Hölder's inequality, 4.4.5

Homothety, 2.5.2

I

Image of a measure, 6.1.1
weighted, 6.1.1

Implicit function theorem, 13.7.6

Improper integral, 4.6.4
convergent (divergent), 4.6.4
absolutely, conditionally, 4.6.5

Independent functions, 6.4.4

Induced algebra of sets, 1.1.2

Inner measure, 2.2.2

Integrable function, 4.1.3

Integral, 4.1.2, 4.1.3, 13.1.2, 13.6.3
Euler–Poisson, 4.6.3, 5.3.2, 6.2.4, 6.4.2
Fourier, 10.5.3
Fresnel, 4.6.4, 7.4.8
improper, 4.6.4

- over a path, 8.5.2
- with respect to a function of bounded variation, 4.11.4
- with respect to a charge, 11.1.8

Inverse transform, 10.5.4

Isodiametric inequality, 2.8.3

Isoperimetric inequality, 2.8.2, 10.2.1, 13.4.7

J

Jacobi matrix, 13.7.1

- of a map, 6.2.1, 8.1.1

Jacobian, 6.2, 8.1

Jensen's inequality, 13.4.3

John's theorem, 2.5.5

Joint distribution of functions, 6.4.4

Jordan decomposition, 11.1.7

Jump function, 4.10.4

K

k -dimensional area, 8.2.1

- manifold, 8.2.1

Khintchine's inequality, 6.4.5

Kolmogorov's inequality, 10.2.7

Kronrod–Federer theorem, 8.4.2

L

L_{loc} condition, 7.1.2

\mathcal{L}^p norm, 9.1.1

Lagrange's inequality, 13.7.2
lemma, 9.3.6

Laguerre functions, 10.2 (Ex. 3)

Laplace asymptotic formula, 7.3.2
equation, 8.7.9
operator, 8.7.1

Lebesgue condition (L), 4.8.3

- decomposition, 11.2.3
- differentiation theorem, 4.9.2, 4.9.3, 11.3.4
- dominated convergence theorem, 3.3.2, 4.8.3, 4.8.4

- measurable set, 2.1.2, 8.3

- measure, 2.1.2

- outer, inner, 2.6.2

- point, 4.9.2

- sets 1st–4th kind, 3.1.1

Legendre duplication formula, 7.2.4

- polynomials, 10.2.4

Leibniz rule, 7.1.5, 7.4.5

Length of a path, 8.2.3

- of an arc, 8.2.3

Levi's theorem, 4.2.2, 4.8.2

Lindelöf's theorem, 8.1.5

Linear functional, 12.1

Liouville's theorem, 8.7.5

Lipschitz condition, 2.3.1
of order α , 2.3 (Ex. 6), 10.4.5

- Lipschitz condition (*cont.*)
 - constant, 2.3.1
 - manifold, 8.8.1
 - Local parametrization, 8.1.1
 - Localization principle, 10.3.3
 - property, 7.6.1
 - Locally compact space, 12.2.1
 - potential vector field, 8.5.2
 - summable function, 4.9.2, 7.5.3
 - Logarithmic potential, 8.7.1
 - Logarithmically convex function, 7.2.8
 - Lower semicontinuity of the area, 8.8.5
 - Luzin–Denjoy theorem, 10.3.10
 - Luzin’s theorem, 3.4.3
- M**
- M -neighborhood, 8.1.1
 - Manifold, 8.1.1
 - piecewise smooth, 8.1.1
 - simple, 8.1
 - Lipschitz, 8.8.1
 - smooth, 8.1.1
 - Map bi-Lipschitz, 8.8.1
 - differentiable, 13.7.1
 - ergodic, 10.2.3
 - expanding, 2.6.2
 - Maximal function, 4.9.1, 9.1.4
 - Maximum principle, 8.7.7
 - Mean value theorem, 4.7.2, 13.1.2
 - for harmonic functions, 8.7.5
 - Measurable function, 3.1.2
 - rectangle, 5.1.1
 - set, 1.3.4
 - space, 3.1
 - Measure, 1.3.1
 - absolutely continuous, 11.2.1
 - Borel, 2.2.3
 - Borel–Stieltjes, 4.10.3
 - complete, 1.4.3
 - counting, 1.3.1
 - discrete, 1.3.1
 - finite, *see* volume, finite,
 - Hausdorff, 2.6.3
 - inner, 2.2.2
 - Lebesgue, 2.1.2
 - Lebesgue–Stieltjes, 4.10.3
 - outer, 1.4.2
 - Hausdorff, 2.6.1
 - Radon, 12.2.2
 - regular, 2.2.3, 13.3.1
 - σ -finite, *see* volume, σ -finite,
 - space, 1.3.4
 - Measures, mutually singular, 11.2.3
 - Mesh of a partition, 4.7.3
 - Metric projection, 13.4.2
 - Minkowski area, 2.8.2
 - inequality, 4.4.6
 - Monotone class of sets, 1.6.3
 - Monotonicity of a volume, 1.2.3
 - of an outer measure, 1.4.2
 - Morse’s theorem, 13.7.8
- N**
- Natural parametrization, 8.2.3
 - Negligible set, 8.6.4
 - Neighborhood of a point on a manifold, 8.1.1
 - Non-trivial part of the boundary of a beam, 8.6.2
 - Norm Euclidean, 1.1.6
 - of a function, 9.1.1
 - of a functional, 12.3.1
 - Normal, outer, 8.6.2, 13.4.1
 - corresponding to a parametrization, 8.3.4
- O**
- Open mapping theorem, 13.7.3
 - Order continuous functional, 12.1.2
 - Ordinary volume, 1.2.2
 - Orientation corresponding to a parametrization, 8.5.2
 - on a smooth curve, 8.5.2
 - Oriented boundary of a planar standard compactum, 8.6.7
 - curve, 8.5.2
 - Orthogonal basis, 10.1.5
 - functions, 10.1.2
 - system, 10.1.2
 - Orthonormal system, 10.1.2
 - Outer measure, 1.4.2
 - generated by a measure, 1.4.3
 - p -dimensional Hausdorff, 2.6.1
 - normal, 8.6.2, 13.4.1
 - side of the boundary, 8.6.2, 8.6.5
- P**
- Parallelepiped, 1.1.6, 2.5.3
 - accompanying, 8.3.1
 - rectangular, 1.1.6, 2.5.3
 - Parametrization canonical, 8.1.3
 - global, local, 8.1.1
 - natural, 8.2.3
 - smooth, 8.1.1
 - Parseval’s identity, 10.1.5, 10.2.1
 - Partition admissible, 3.2.1, 13.6.1
 - canonical, 1.1.3
 - of a set, 1.1.1
 - of unity, 8.1.6, 12.2.3
 - subordinate to a cover, 8.1.8, 12.2.3
 - tagged, 4.7.3

Path rectifiable, 8.2.3
 smooth, piecewise smooth, 8.1.2
 Periodic approximate identity, 7.6.5
 Piecewise smooth manifold, 8.1.1
 path, 8.1.2
 Plane, 2.1.3, 13.4.1
 supporting, 13.4.1
 tangent, 8.1.2
 Point mass potential, 8.7.1
 Pointwise convergence, 3.1.4
 Poisson formula, 8.7.10
 kernel, for the ball, 8.7.10
 for the half-space, 8.7.13
 summation formula, 10.6.1, 10.6.2
 Polar coordinates, 6.2.4, 6.2.5
 Polynomials Hermite, 10.2.4
 Legendre, 10.2.4
 Positive functional, 12.2.2
 Positivity set, 11.1.3
 Potential vector field, 8.5.2
 Product of measure spaces, 5.1.3
 measure, 5.1.3
 infinite, 5.6.1
 of semirings, 1.1.5
 of volumes, 1.2.4

R

Rademacher functions, 6.4.5, 10.2.6
 theorem, 11.4.2
 Radon measure, 12.2.2
 Radon–Nikodym theorem, 11.2.1
 Ray, 13.4.1
 Recurrence theorem, 6.1.3
 Rectangular parallelepiped, 1.1.6, 2.5.3
 Rectifiable arc, 8.2.3
 path, 8.2.3
 Regular cover, 2.7.4, 4.9.4
 measure, 2.2.3, 13.3.1
 part of the boundary, 8.6.4
 Regularity of a measure, 2.2.2, 2.2.3
 outer, inner, 13.3.1
 of the Lebesgue measure, 2.2.2
 Retraction theorem, 6.6.2
 Riemann–Lebesgue theorem, 9.2.5
 Riemann sum, 4.7.3
 Riesz–Fischer theorem, 10.1.4
 Riesz–Kakutani theorem, 12.2.2
 Riesz’s theorem, 3.3.4
 Rigid motion in \mathbb{R}^m , 2.4.1
 Ring of sets, 1.1.2

S

Sampling formula, 10.5.1
 Sard’s theorem, 13.5.1, 13.5.2

Semiring of cells, 1.1.6
 of sets, 1.1.4
 Separated sets, 2.6.2
 Set of full measure, 4.3.1
 measurable with respect to an outer
 measure, 1.4.2
 negligible, 8.6.4
 Side of a smooth surface, 8.5.3
 corresponding to a parametrization, 8.5.3
 of a graph (upper, lower), 8.5.3
 σ -algebra of sets, 1.1.2
 σ -compact space, 12.2.9
 σ -finite volume, 1.2.2
 Simple arc, 8.2.3
 function, 3.2.1, 13.6.1
 Lipschitz manifold, 8.8.1
 manifold, 8.1
 Smooth manifold, 8.1.1
 parametrization, 8.1.1
 path, 8.1.2
 Sobolev approximate identity, 7.6.2
 Space dual, 12.1.1
 locally compact, 12.2.1
 measurable, 1.3.4, 3.1.1
 measure, *see* measure space,
 of measurable functions, 12.1.1
 σ -compact, 12.2.9
 Spherical coordinates, 6.2.4, 6.2.5
 Standard compact set, 8.6.4
 Step function, 9.2.2
 Stirling’s formula, 7.2.6
 Strong monotonicity of a volume, 1.2.3
 Strongly measurable function, 13.6.1
 Subadditivity countable, 1.3.2, 1.4.2
 finite, 1.2.3, 1.4.2
 Subgraph of non-negative function, 5.2.3
 Subspace affine, 13.4.1
 tangent, 8.1.2
 affine, 8.1.2
 Sum of a family of numbers, 1.2.2
 Summable family, 1.2.2
 function, 4.1.3, 13.6.3
 Support of a function, 7.5.3, 12.2.1
 Supporting plane, 13.4.1
 Surface, 8.1.1
 two-sided, 8.5.3
 Symmetric system of sets, 1.1.1
 Symmetry principle, 8.7.12

T

Tagged partition, 4.7.3
 Tangent plane, 8.1.2
 subspace, 8.1.2
 vector, 8.1.2

Theorem on a monotone class, 1.6.3
 on a partition of unity subordinate to a cover, 8.1.8
 on a smooth descent, 8.1.7
 partition of unity, 8.1.6
 on approximation by simple functions, 3.2.2
 on characterization of bases, 10.1.5
 on continuity in the mean, 9.2.4
 on the limit of the Riemann sums, 4.7.3, 4.8.5
 on the local invertibility, 13.7.5
 on the measure of the subgraph, 5.2.3
 on the uniqueness of an extension of a measure, 1.5.1
 Three chords lemma, 13.4.3
 Tietze–Urysohn theorem, 13.2.2
 Tonelli’s theorem, 5.3.1
 Total variation of a function, 4.11.1
 of a charge, 11.1.4
 Translation, 2.4.1
 of a function, 9.2.4
 Triangle inequality, 9.1.1
 Trigonometric polynomials, 10.2.1
 system, 10.2.1, 10.2.2
 Trivial part of the boundary of a beam, 8.6.2
 Two-sided surface, 8.5.3

U

Uncertainty principle, 10.5.9
 Uniform convergence, of an improper integral, 7.4.2

V

De la Vallée Poussin’s theorem, 4.8.7
 Variation of a charge, 11.1.4
 positive, negative, 11.1.7
 of a function, 4.11.1
 Vector field, 6.6.4, 8.5.1
 locally potential, 8.5.2
 potential, 8.5.2
 Vitali cover, 2.7.2
 theorem, 2.7.2, 4.8.7
 Volume, 1.2.2
 continuous from above, from below, 1.3.4
 countably additive, 1.3.1
 subadditive, 1.3.2
 finite, 1.2.2
 of a ball, 5.4.2
 ordinary, 1.2.2
 σ -finite, 1.2.2

W

Walsh functions, 10.2.5
 Weak contraction, 2.6.2
 Weakly measurable function, 13.6.6
 Weierstrass approximation theorem, 7.6.4, 7.6.5
 formula, 7.2.3
 Weight (function), 4.5.3, 6.1.1
 Weighted image of a measure, 6.1.1
 Wide-sense measurable function, 4.3.3

Y

Young’s inequality, 9.3.2

Z

Zero-one law, 6.4.4