

Cambridge studies in advanced mathematics

Multidimensional Real Analysis II

Integration

J. J. DUISTERMAAT
AND J. A. C. KOLK

A decorative graphic in the bottom right corner consisting of several parallel diagonal stripes. The stripes are in shades of green and olive, separated by thin white lines, and extend from the bottom edge towards the top right corner.

Contents

Volume II

<i>Preface</i>	xi
<i>Acknowledgments</i>	xiii
<i>Introduction</i>	xv
6 Integration	423
6.1 Rectangles	423
6.2 Riemann integrability	425
6.3 Jordan measurability	429
6.4 Successive integration	435
6.5 Examples of successive integration	439
6.6 Change of Variables Theorem: formulation and examples	444
6.7 Partitions of unity	452
6.8 Approximation of Riemann integrable functions	455
6.9 Proof of Change of Variables Theorem	457
6.10 Absolute Riemann integrability	461
6.11 Application of integration: Fourier transformation	466
6.12 Dominated convergence	471
6.13 Appendix: two other proofs of Change of Variables Theorem	477
7 Integration over Submanifolds	487
7.1 Densities and integration with respect to density	487
7.2 Absolute Riemann integrability with respect to density	492
7.3 Euclidean d -dimensional density	495
7.4 Examples of Euclidean densities	498
7.5 Open sets at one side of their boundary	511
7.6 Integration of a total derivative	518
7.7 Generalizations of the preceding theorem	522
7.8 Gauss' Divergence Theorem	527
7.9 Applications of Gauss' Divergence Theorem	530
8 Oriented Integration	537
8.1 Line integrals and properties of vector fields	537
8.2 Antidifferentiation	546
8.3 Green's and Cauchy's Integral Theorems	551

8.4	Stokes' Integral Theorem	557
8.5	Applications of Stokes' Integral Theorem	561
8.6	Apotheosis: differential forms and Stokes' Theorem	567
8.7	Properties of differential forms	576
8.8	Applications of differential forms	581
8.9	Homotopy Lemma	585
8.10	Poincaré's Lemma	589
8.11	Degree of mapping	591
Exercises		599
	Exercises for Chapter 6	599
	Exercises for Chapter 7	677
	Exercises for Chapter 8	729
	Notation	779
	Index	783