

# Contents

Preface	ix
A remark on notation	x
Acknowledgments	xi
<b>Chapter 1. Real analysis</b>	
§1.1. A quick review of measure and integration theory	3
§1.2. Signed measures and the Radon-Nikodym-Lebesgue theorem	15
§1.3. $L^p$ spaces	27
§1.4. Hilbert spaces	45
§1.5. Duality and the Hahn-Banach theorem	59
§1.6. A quick review of point-set topology	71
§1.7. The Baire category theorem and its Banach space consequences	85
§1.8. Compactness in topological spaces	101
§1.9. The strong and weak topologies	117
§1.10. Continuous functions on locally compact Hausdorff spaces	133
§1.11. Interpolation of $L^p$ spaces	157

§1.12. The Fourier transform	183
§1.13. Distributions	211
§1.14. Sobolev spaces	235
§1.15. Hausdorff dimension	257
<b>Chapter 2. Related articles</b>	
§2.1. An alternate approach to the Carathéodory extension theorem	277
§2.2. Amenability, the ping-pong lemma, and the Banach-Tarski paradox	281
§2.3. The Stone and Loomis-Sikorski representation theorems	293
§2.4. Well-ordered sets, ordinals, and Zorn's lemma	301
§2.5. Compactification and metrisation	311
§2.6. Hardy's uncertainty principle	317
§2.7. Create an epsilon of room	323
§2.8. Amenability	333
Bibliography	339
Index	345