

Preface

This is the second part of the project initiated with “Exercises in Analysis. Part 1.” In that volume we focused on some classical tools from Analysis. Specifically we considered Metric Spaces, Measure Theory, the interplay between Measure Theory and Topology, and Functional Analysis (Banach Spaces). In the present volume we turn our attention to the main topics of Nonlinear Analysis, which are useful in applications. So, we deal with the following subjects:

1. Function Spaces
2. Nonlinear and Multivalued Maps
3. Smooth and Nonsmooth Calculus
4. Degree Theory and Fixed Point Theory
5. Variational and Topological Methods

Each one of the above topics is a separate chapter. Each chapter starts with a comprehensive presentation of the theory and then has on the average 200 problems together with their solutions. The problems are marked with \star , $\star\star$, and $\star\star\star$ according to the level of difficulty of the problem (\star for easy, $\star\star$ for reasonable, and $\star\star\star$ for difficult). We believe that people using tools of nonlinear analysis will find useful information either in the summary of the theory or in the problems. The topics studied in this volume cover a large part of what is known as Nonlinear Analysis.

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Exercises in Analysis

Part 2: Nonlinear Analysis

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