

Preface

There has been increasing interest in recent years to develop a critical point theory by which one can obtain additional information on the critical points of a differentiable functional. What I mean by additional information is the locations of the critical points related to closed convex subsets in Banach spaces. This is the theme of the current book.

This book mainly reflects a significant part of my research activity during recent years. Except for the last chapter, it is constructed based on the results obtained myself or through direct cooperation with other mathematicians. On the whole, the readers will observe that the main abstract existence theorems of critical points in classical minimax theory are generalized to the cases of sign-changing critical points. Hence, a new theory is built. To the best of my knowledge, no book on sign-changing critical point theory has ever been published.

The material covered in this book is for advanced graduate and PhD students or anyone who wishes to seek an introduction into sign-changing critical point theory. The chapters are designed to be as self-contained as possible.

I have had the good fortune to teach at the University of California at Irvine and to work with Martin Schechter for the years 2001 to 2004. During that period, some results of the current book were obtained. M. Schechter has had a profound influence on me not only by his research, but also by his writing and his generosity. I am grateful to T. Bartsch and Z. Q. Wang for sending me their interesting papers and enlightening discussions with Wang when I visited Utah. Thanks also go to A. Szulkin and M. Willem for inviting me to visit their prestigious departments years ago. Special thanks are also given to S. Li who first introduced me into the variational and topological methods ten years ago. I wish to thank the University of California at Irvine for providing me a favorable environment during the period 2001 to 2004. This book is supported by the NSFC (No. 10001019 & 10571096), the SRF-ROCS-SEM, the Program of the Education Ministry in P. R. China for New Century Excellent Talents in Universities of China.

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