Preface

Fractional differential and integral equations generalize integrals and derivatives to noninteger orders. They were found to play a fundamental role in the modeling of a considerable number of phenomena in many areas, including electrical engineering, electronics, telecommunications, electromagnetism, electrochemistry, thermal engineering, mechanics, mechatronics, rheology, automatic control, robotics, signal processing, image processing, biology, biophysics, physics, and economics. The purpose of this book is to present detailed results about the existence and stability of various classes of fractional differential and integral equations and inclusions involving the Caputo fractional derivative and the Hadamard fractional integral. Some equations contain delays that may be finite or infinite. Others are subject to an impulsive effect. The tools used include classical fixed point theorems and new ones such as Darbo's and Mönch's fixed point theorems, as well as some Gronwall and Pachpatte lemmas. Each chapter concludes with a section devoted to notes and bibliographical remarks; all abstract results are illustrated with examples.

The content of this book complements the existing literature in fractional calculus. It is useful for researchers and graduate students for research, seminars, and advanced graduate courses in pure and applied mathematics, engineering, biology, and all other applied sciences.

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