



## Topics in Fractional Differential Equations (Developments in Mathematics, Vol. 27)

By Saïd Abbas, Mouffak Benchohra, Gaston M. N'Guérékata

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### Editorial Review

From the Back Cover

During the last decade, there has been an explosion of interest in fractional dynamics as it was found to play a fundamental role in the modeling of a considerable number of phenomena; in particular the modeling of memory-dependent and complex media. Fractional calculus generalizes integrals and derivatives to non-integer orders and has emerged as an important tool for the study of dynamical systems where classical methods reveal strong limitations. This book is addressed to a wide audience of researchers working with fractional dynamics, including mathematicians, engineers, biologists, and physicists. This timely publication may also be suitable for a graduate level seminar for students studying differential equations.

*Topics in Fractional Differential Equations* is devoted to the existence and uniqueness of solutions for various classes of Darboux problems for hyperbolic differential equations or inclusions involving the Caputo fractional derivative. In this book, problems are studied using the fixed point approach, the method of upper and lower solution, and the Kuratowski measure of noncompactness. An historical introduction to fractional calculus will be of general interest to a wide range of researchers. Chapter one contains some preliminary background results. The second Chapter is devoted to fractional order partial functional differential equations. Chapter three is concerned with functional partial differential inclusions, while in the fourth chapter, we consider functional impulsive partial hyperbolic differential equations. Chapter five is concerned with impulsive partial hyperbolic functional differential inclusions. Implicit partial hyperbolic differential equations are considered in Chapter six, and finally in Chapter seven, Riemann-Liouville fractional order integral equations are considered. Each chapter concludes with a section devoted to notes and bibliographical remarks. The work is self-contained but also contains questions and directions for further research.

### Users Review

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