1. Record Nr. UNINA9910983032803321

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| Autore | Atangana Abdon |
| Titolo | Fractional Differential and Integral Operators with Respect to a Function : Theory Methods and Applications / / by Abdon Atangana, Iknur Koca |
| Pubbl/distr/stampa | Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2025 |
| ISBN | 9789819799510<br>9819799511 |
| Edizione | [1st ed. 2025.] |
| Descrizione fisica | 1 online resource (441 pages) |
| Collana | Industrial and Applied Mathematics, , 2364-6845 |
| Altri autori (Persone) | Kocalknur |
| Disciplina | 515.35 |
| Soggetti | Differential equations<br>Mathematical analysis<br>Differential Equations<br>Analysis<br>Equacions diferencials<br>Anàlisi matemàtica<br>Llibres electrònics |
| Lingua di pubblicazione | Inglese |
| Formato | Materiale a stampa |
| Livello bibliografico | Monografia |
| Nota di contenuto | History of differential and integral calculus.-Global derivatives, definitions and properties -- Integral operators, definitions and properties -- Inequalities related to global fractional derivatives -- Inequalities associated to Integrals -- Existence and Uniqueness of IVP with global differentiation on via Picard iteration -- Existence and uniqueness via Carathéodory approach -- Existence and uniqueness analysis of nonlocal global differential equations with expectation approach -- Chaplygin’s method for global differential equations -- Numerical analysis of IVP with classical global derivative.-Numerical analysis of IVP with Riemann-Liouville global derivative -- Numerical analysis of IVP with Caputo-Fabrizio global derivative -- Numerical analysis of IVP with Atangana-Baleanu global derivative -- Examples and applications of global fractional differential equations. |
| Sommario/riassunto | This book explores the fundamental concepts of derivatives and integrals in calculus, extending their classical definitions to more advanced forms such as fractional derivatives and integrals. The |

derivative, which measures a function's rate of change, is paired with its counterpart, the integral, used for calculating areas and volumes. Together, they form the backbone of differential and integral equations, widely applied in science, technology, and engineering. However, discrepancies between mathematical models and experimental data led to the development of extended integral forms, such as the Riemann–Stieltjes integral and fractional integrals, which integrate functions with respect to another function or involve convolutions with kernels. These extensions also gave rise to new types of derivatives, leading to fractional derivatives and integrals with respect to another function. While there has been limited theoretical exploration in recent years, this book aims to bridge that gap. It provides a comprehensive theoretical framework covering inequalities, nonlinear ordinary differential equations, numerical approximations, and their applications. Additionally, the book delves into the existence and uniqueness of solutions for nonlinear ordinary differential equations involving these advanced derivatives, as well as the development of numerical techniques for solving them.