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Preface

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The concept of fractional derivative appeared for the first time in the famous correspondence between G.A. de L'Hospital and G.W. Leibniz, in 1695. Many mathematicians have further developed this area and we can mention the studies of L. Euler (1730), J.L. Lagrange (1772), P.S. Laplace (1812), J.B.J. Fourier (1822), N.H. Abel (1823), J. Liouville (1832), B. Riemann (1847), O. Heaviside (1892), H. Weyl (1919), M. Riesz (1949), W. Feller (1952). In the past 40 years, fractional calculus has played a very important role in various fields such as mechanics, electricity, chemistry, biology, economics, notably control theory, and signal and image processing.

In the recent years, fractional calculus has been recognized as one of the best tools to describe long-memory processes. The corresponding mathematical models of these processes are fractional systems. Due to the extensive applications of fractional systems in engineering and science, research in this area has grown significantly all around the world.

New challenging problems related to fractional systems have been addressed in this special issue. The issue contains papers on optimization of complex-order algorithms for the discrete-time control of systems, as well as research on control, asymptotic behavior and stability of nonlinear fractional dynamical systems and evolution equations. Furthermore, fractional order iterative learning controls are investigated.

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