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Semi-Analytical Solutions for Some Types of Nonlinear Fractional-Order Differential Equations Based on Third-Kind Chebyshev Polynomials		
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Abstract: This study introduces approximate solutions for a class of nonlinear fractional-order differential equations using Caputo fractional derivatives. It briefly discusses third-kind Chebyshev polynomials and constructs operational matrices for fractional and integer-order derivatives associated with these polynomials. These matrices are integral to the proposed method, which transforms the nonlinear fractional-order differential equations into a system of algebraic equations that can be numerically solved. The error bound of the method is calculated, and numerical experiments are conducted to demonstrate its accuracy and efficiency in solving nonlinear multi-term fractional-order differential equations.