Study of electrical R-L circuits composed of resistors and inductors and driven by a voltage of the current source: Simulation with implementing an accurate method

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Abstract

In this study, we propose to derive an accurate numerical procedure to solve the mathematical model which describes the electrical R-L circuit composed of resistors and inductors driven by a voltage of current source, which is the fractional-order model for the electrical RL-circuit. Our study depends on the spectral collocation method via the useful properties of the Chebyshev polynomials of the third-kind. Some theorems about the convergence analysis are given. The study concludes by comparing the resulting approximate solutions of the proposed model with the exact solution in the classical case. Illustrative graphical and numerical analysis of the derived results are also included in this study.

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