Singh, Harendra; Singh, Amit Kumar; Pandey, Rajesh K.; Kumar, Devendra; Singh, Jagdev
An efficient computational approach for fractional Bratu's equation arising in electrospinning process. (English) Zbl 07394249

Summary: This article deals with fractional model of Bratu's equation. We have solved fractional model of Bratu's equation using Chebyshev polynomials (CPs). The fractional model of Bratu's equation plays an important role in electrospinning and vibration-electrospinning process. We have discussed the error analysis of proposed scheme. We have also provided the convergence of suggested approximate method. Numerical results are demonstrated for various order of fractional derivative. Error tables reveal the accuracy of the suggested scheme. The outcomes of the present investigation are compared with some known studied and detected that our approach is more efficient and accurate.

MSC:
65-XX Numerical analysis
34A08 Fractional ordinary differential equations

Keywords:
Chebyshev polynomials of third kind; convergence analysis; error analysis; fractional Bratu's equation

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