عنوان مقاله:

Numerical simulation of fuzzy fractional differential equations using a reliable technique

نویسندگان:

Shreya Mukherjee - Department of Mathematics, Sidho-Kanho-Birsha University, West-Bengal, India.

Amit Kumar - Department of Mathematics, Balarampur College, Purulia, West-Bengal, India.

Samaresh Kumbhakar - Department of Mathematics, Sidho-Kanho-Birsha University, West-Bengal, India.

خلاصه مقاله:

This paper studies the analytical solution to the Fractional Differential Equations (FDEs) under uncertainty. Fuzzy differential equations are one of the emerging topics in the present era of research, where we have found an effective combination of FDEs with fuzziness. The Homotopy Analysis Transform Method (HATM) with the Caputo fractional derivative is applied in this work to find the analytical fuzzy solution of two fuzzy FDEs. One of the interesting parts of this study is that we have found upper and lower fuzzy solutions for both fuzzy FDEs. The different graphical representations that have been presented for both examples show that there is a symmetry relation between the upper and lower-cut fuzzy solutions. In this method, the region and rate of convergence of the solution series are controlled by the auxiliary parameter r-cut. This paper shows that the proposed method is reliable and efficient in determining the fuzzy solutions of the FDEs in applied mathematics and engineering.

کلمات کلیدی:

Fuzzy fractional differential equations, Homotopy analysis transform method, upper and lower fuzzy solution, Caputo fractional derivative, r-cut

لینک ثابت مقاله در پایگاه سیویلیکا:

https://civilica.com/doc/2029155