

# Computational Optimization of Residual Power Series Algorithm for Certain Classes of Fuzzy Fractional Differential Equations

**Abstract:** This paper aims to present a novel optimization technique, the residual power series (RPS), for handling certain classes of fuzzy fractional differential equations of order  $1 \leq \gamma \leq 2$  under strongly generalized differentiability. The proposed technique relies on generalized Taylor formula under Caputo sense aiming at extracting a supportive analytical solution in convergent series form. The RPS algorithm is significant and straightforward tool for creating a fractional power series solution without linearization, limitation on the problem's nature, sort of classification, or perturbation. Some illustrative examples are provided to demonstrate the feasibility of the RPS scheme. The results obtained show that the scheme is simple and reliable and there is good agreement with exact solution.

**Keywords:** strongly generalized differentiability, Caputo fractional derivative, Residual power series algorithm, fuzzy fractional initial value problems.

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