

Fractional derivatives for scattered noisy data

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In this paper, we mainly introduce the fractional derivatives for one-dimensional scattered noisy data. Based on the approximation function and inserted inequality theorem, we propose a regularization method for computing the fractional derivatives and give the specific forms of the fractional derivative. We get the convergence rates under two different choices of the regularization parameter and the stability estimates from fractional derivatives' theoretical condition stability in this paper. Numerical examples show that the proposed method is effective and stable.

Keywords: Fractional Derivative, Radial Basis Function, Ill-posed, Condition Stability, Computational method