

# A Numerical Comparison for Resent Modifications of the Decomposition Methods for Nonlinear Fractional KdV Equations

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## Abstract

In this work, we apply some old and a new decomposition scheme to solve the fractional KdV equation and fractional modified KdV equation which are characterized by the solitary wave solutions of the classical nonlinear equations that lead to solitons [1-16]. We meant with the classical nonlinear equations of interest usually admit for the existence of a special type of the traveling wave solutions which are either solitary waves or solitons [1-12]. These approaches are based on the choice of a suitable differential operator which may be ordinary or partial, linear or nonlinear, deterministic or stochastic. It does not require discretization and consequently of massive computation.

In this scheme the solution is performed in the form of a convergent power series with easily computable components. This section is particularly concerned with the modified decomposition methods. We also get numerical results of these particular fractional equations for numerical purpose of the numerical comparisons for those considered different versions of the methods. The numerical results demonstrate that the many of them are relatively accurate and easily implemented.

**Keywords:** The Rach–Adomian–Meyers modified decomposition method; Fractional KdV equation; Fractional mKdV; Modified Riemann–Liouville derivative.

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