

# Solution of Time-Fractional Korteweg-de Vries Equation in warm Plasma

El-Said A. El-Wakil, Essam M. Abulwafa, Emad K. El-shewy, Abeer A. Mahmoud

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The reductive perturbation method has been employed to derive the Korteweg-de Vries (KdV) equation for small but finite amplitude ion-acoustic waves. The Lagrangian of the time fractional KdV equation is used in similar form to the Lagrangian of the regular KdV equation. The variation of the functional of this Lagrangian leads to the Euler-Lagrange equation that leads to the time fractional KdV equation. The Riemann-Liouville definition of the fractional derivative is used to describe the time fractional operator in the fractional KdV equation. The variational-iteration method given by He is used to solve the derived time fractional KdV equation. The calculations of the solution with initial condition  $A_0 \text{sech}(cx)^2$  are carried out. The result of the present investigation may be applicable to some plasma environments, such as ionosphere.

Comments: The paper is in tex format+3 figures in eps

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