**The Modified Kudryashov Method for Solving Some Evolution Equations**

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**Abstract**

The study of numerical methods for solving partial differential equations and the travelling wave solutions of these equations have significant roles in physical science over the last decades from both theoritical and the practical points of view. Mathematical physics consist of many mathematical models which described by the nonlinear partial differential equations. The investigation of the travelling wave solutions of nonlinear evolution equations appears in various scientific fields, such as plasma physics, fluid mechanics, hydrodynamic, optical fibers, chemical physics. Many powerful and effective methods are used for investigating the explicit travelling wave solutions.

In this paper, we have applied the modified Kudryashov method for solving some nonlinear evolution equations by the help of commutative algebra. This method is applicable for the other nonlinear partial differential equations.

We consider the general nonlinear partial differential equation for a function  of two variables, space and time :

 (1)

It is useful to summarize the steps of modified Kudryashov method as follows[5]:

**Step 1.** We investigate the travelling wave solutions of Eq.(1) of the form:

  (2)

where and are arbitrary constants. Then Eq.(1) reduces to a nonlinear ordinary differential equation of the form:

  (3)

**Step 2.** We suppose that the exact solutions of Eq.(3) can be obtained in the following form:

  (4) where  and the function is the solution of equation

  (5)

**Step 3.** According to the method, we assume that the solution of Eq.(3) can be expressed in the form

  (6)

Calculation of value in formula (6) that is the pole order for the general solution of Eq. (3). In order to determine the value of we balance the highest order nonlinear terms in Eq. (3) analogously as in the classical Kudryashov method. Supposing  and  are the highest order nonlinear terms of Eq. (3) and balancing the highest order nonlinear terms we have:

  (7)

**Step 4.** Substituting Eq.(4) into Eq.(3) and equating the coefficients of  to zero, we get a system of algebraic equations. By solving this system, we obtain the exact solutions of Eq.(1).

**References**

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