

REDUCED DIFFERENTIAL TRANSFORM METHOD FOR  
SIXTH-ORDER SINGULARLY PERTURBED BOUSSINESQ  
EQUATION

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**Abstract**

We consider the following the ill-posed Boussinesq equation and sixth-order singularly perturbed Boussinesq equation, respectively:

$$u_{tt} = u_{xx} + u_{xx}^2 + u_{xxxx},$$

and

$$u_{tt} = u_{xx} + u_{xx}^2 + u_{xxxx} + \epsilon u_{xxxxxx}$$

The purpose of this paper is to obtain the approximate solution of sixth-order singularly perturbed Boussinesq equation and the ill-posed Boussinesq equation ( $\epsilon = 0$ ) by the reduced differential transform method (RDTM). This numerical method for solving a wide variety of linear and nonlinear partial differential equations usually gets the solution in a series form. The suggested algorithm is quite efficient and is practically well suited for use in these problems. Several examples are presented to demonstrate the efficiency and reliability of the RDTM (Because this method yield the desired accuracy only in a few terms and in a series form of the exact solution), and numerical results are discussed, compared with exact solution. The numerical results show that this method is a powerful tool for solving nonlinear singular perturbed PDEs and the results show that the method reduces the numerical calculations.

**Keywords:** Singularly perturbed Boussinesq equation, Il-posed Boussinesq equation, Reduced differential transform method.

**References**

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