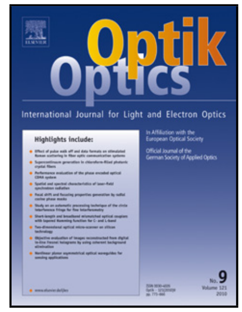
Accepted Manuscript



Title: A supplement to the paper of Zayed et al. [Optik, 170 (2018) 339–341]

Author: İsmail Aslan

PII: S0030-4026(18)31308-1
DOI: https://doi.org/10.1016/j.ijleo.2018.09.013
Reference: IJLEO 61452

To appear in:

Received date: 29-6-2018
Accepted date: 6-9-2018

A supplement to the paper of Zayed et al. [Optik, 170 (2018) 339–341]

İsmail Aslan

Department of Mathematics, Izmir Institute of Technology, Urla, İzmir 35430, Turkey

E-mail: ismailaslan@iyte.edu.tr

Abstract

It seems that the results obtained by the so-called Khater method contain computational or print errors. We look at this issue from a different point of a view, namely, from a theoretical side. We prove our claim by a formal direct approach instead of back substitution (trial and error) approach.

Keywords: Khater method; Auxiliary equation; Exact solution; Nonlinear evolution equation

1. Introduction

Recently, Zayed et al. [1] made comments on the results of the so-called Khater method (KM) which was proposed for finding exact traveling wave solutions of nonlinear evolution equations. They stated that the new auxiliary equation method (KM) is wrong and consequently, all the exact solutions obtained in [2, 3] are all wrong. In [1], they supported their claim by substituting the first four solutions (4), (7), (10), (13) into the auxiliary equation of the KM and checked the left/right hand sides for whether they match or not. They concluded that all exact solutions obtained by KM are all wrong. Finally, they made a call to the research community for not using KM in their studies. However, since the involved expressions are large and complicated, we think that their approach (trial and error) is also open to incorrect computations. We believe that a much more convincing approach needs to be demonstrated to resolve this serious issue. That is why, in this note, we give a formal direct treatment to show that the published results of the so-called Khater method may contain computational or print errors.

Indeed, the so-called KM is noting but the well-known generalized Riccati equation mapping method (GREMM). First of all, the KM [2, 3] assumes that the solution of a nonlinear evolution equation can be written in the form

$$u(\xi)=\sum_{i=0}^{N} a_i (a^{f(\xi)})^i , \tag{1}$$

where $f(\xi)$ satisfies the auxiliary equation

$$f'(\xi)=\frac{1}{\text{In}(a)}(\alpha a^{-f(\xi)}+\beta+\sigma a^{f(\xi)}), \tag{2}$$

in which a_i, α, β, σ and a are arbitrary constants with $a_N \neq 0$, $a>0$, $a\neq 1$. Now, we show that Eq. (2) can always be reduced to a Riccati equation. To do so, the substitution that is needed is

$$F(\xi)=a^{f(\xi)}. \tag{3}$$