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Abstract

In this scholarly analysis, we aim to address the inaccuracies and unsupported claims presented in the paper “Math. Meth. Appl. Sci. 2023;1–3,” authored by Elsayed M. E. Zayed and Shoukry El-Ganaini. Their paper [1] asserts that the authors of “Math Meth Appl Sci. 2021;44:2682–2691” employed the Khater method to solve the nonlinear fractional Cahn–Allen equation. It is imperative to emphasize that this claim lacks validity. Contrarily, upon a meticulous examination of our own work [2], we find that Mostafa M. A. Khater, Ahmet Bekir, Dianchen Lu, and Raghda A. M. Attia employed the modified Khater method, a robust computational technique recently introduced by Prof. Mostafa M. A. Khater. This assertion is substantiated by a substantial body of Prof. Mostafa M. A. Khater’s work (as cited in references [3–6]). These findings unmistakably contradict the assertions made in “Math. Meth. Appl. Sci. 2023,” which erroneously claim the utilization of the Khater method. It is also of utmost importance to address the implications of these inaccuracies. The claims put forth by Zayed and El-Ganaini not only misrepresent the actual methodology used but also erroneously question the authorship of the modified Khater method, implying that it does not originate from Prof. Mostafa M. A. Khater. To counter this assertion, we emphasize Prof. Khater’s extensive publication history, which indisputably demonstrates his scholarly contributions employing the modified Khater method in the years 2018 and 2019 (as thoroughly documented in references [3–6]). In summary, our analysis underscores the discrepancies and ethical concerns within the aforementioned paper, asserting that it not only misrepresents the methodology employed but also inaccurately questions the ownership of the modified Khater method. This casts doubt on the integrity of the authors’ claims, suggesting an unwarranted attempt to appropriate the contributions of another researcher.

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Abstract: In this scholarly analysis, we aim to address the inaccuracies and unsupported claims presented in the paper “Math. Meth. Appl. Sci. 2023;1–3,” authored by Elsayed M. E. Zayed and Shoukry El-Ganaini. Their paper [1] asserts that the authors of “Math Meth Appl Sci. 2021;44:2682–2691” employed the Khater method to solve the nonlinear fractional Cahn–Allen equation. It is imperative to emphasize that this claim lacks validity.

Contrarily, upon a meticulous examination of our own work [2], we find that Mostafa M. A. Khater, Ahmet Bekir, Dianchen Lu, and Raghib A. M. Attia employed the modified Khater method, a robust computational technique recently introduced by Prof. Mostafa M. A. Khater. This assertion is substantiated by a substantial body of Prof. Mostafa M. A. Khater’s work (as cited in references [3–6]). These findings unmistakably contradict the assertions made in “Math. Meth. Appl. Sci. 2023,” which erroneously claim the utilization of the Khater method.

It is also of utmost importance to address the implications of these inaccuracies. The claims put forth by Zayed and El-Ganaini not only misrepresent the actual methodology used but also erroneously question the authorship of the modified Khater method, implying that it does not originate from Prof. Mostafa M. A. Khater. To counter this assertion, we emphasize Prof. Khater’s extensive publication history, which indisputably demonstrates his scholarly contributions employing the modified Khater method in the years 2018 and 2019 (as thoroughly documented in references [3–6]).

In summary, our analysis underscores the discrepancies and ethical concerns within the aforementioned paper, asserting that it not only misrepresents the methodology employed but also inaccurately questions the ownership of the modified Khater method. This casts doubt on the integrity of the authors’ claims, suggesting an unwarranted attempt to appropriate the contributions of another researcher.

Keywords: Khater method; Modified Khater method; Generalized Khater method; Khater II method.

1 Introduction

First and foremost, I am not surprised by the conduct exhibited by Elsayed M. E. Zayed and Shoukry El-Ganaini. They have made persistent attempts to disseminate unfounded claims in various journals, including Physica A: Statistical Mechanics and its Applications, Chaos, Solitons & Fractals, among others. However, in each instance, these journals have subjected their submissions to my scrutiny before proceeding.

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Invariably, upon careful examination, these papers all have been rejected.

At present, we endeavor to meticulously address each facet of their assertions, aiming to demonstrate to both readers and journal editors that “Math. Meth. Appl. Sci. 2023;1–3 ”is a spurious publication. It not only reflects a regrettable lack of scholarly integrity but also appears to harbor ill intentions. Specifically, it seeks to appropriate the work of a distinguished professor who has contributed significantly to the field, bearing the name of “Khater method; Modified Khater method; Generalized Khater method; Khater II method [7-20].”

This response is grounded in our commitment to upholding the principles of sound scientific inquiry and preserving the rightful recognition of esteemed scholars.

Response to the fake claims:

1. They assert that Mostafa M. A. Khater, Ahmet Bekir, Dianchen Lu, and Raghdha A. M. Attia utilized the 'Khater' method to address the nonlinear fractional Cahn–Allen equation. However, this assertion is inaccurate, as evidenced in [1], where the employed technique is clearly identified as the modified Khater method. It is worth noting that a meticulous examination of both analytical and semi–analytical solutions reveals a negligible difference, underscoring the high degree of accuracy in both methodologies.

2. They contend that attributing the 'Modified Khater' method to Prof. Mostafa M.A. Khater is unwarranted, suggesting its designation as the "El-Ganaini et al. method. "However, this assertion is fundamentally flawed. Prof. Mostafa M.A. Khater undeniably originated and effectively applied this technique to address various nonlinear evolution equations, as conclusively demonstrated by his publications in the years 2018 and 2019 [3-6]. These publications provide substantial evidence supporting his unequivocal ownership of this method.

It is my firm belief that their primary motivation is to deliberately obfuscate the truth, a stance that appears incongruous with a comprehensive examination of the aforementioned papers [3-6].

3. They showed in their paper [1] that the solutions of the modified khater method’s auxiliary equation

\[ f'(\xi) = \frac{\beta + \alpha K^{-f(\xi)} + \sigma K^{f(\xi)}}{ln(K)} \]  

(1)

where \( \alpha, \beta, \sigma, \) are arbitrary constants, are given for \( \beta^2 - \alpha \sigma < 0 \) \& \( \sigma \neq 0 \) by

\[ K^{f(\xi)} = \frac{-\beta}{\sigma} + \frac{\sqrt{\alpha \sigma - \beta^2}}{\sigma} \tan \left( \frac{\xi}{2} \sqrt{\alpha \sigma - \beta^2} \right) , \]  

(2)

\[ K^{f(\xi)} = \frac{-\beta}{\sigma} + \frac{\sqrt{\alpha \sigma - \beta^2}}{\sigma} \cot \left( \frac{\xi}{2} \sqrt{\alpha \sigma - \beta^2} \right) , \]  

(3)

and for \( \beta^2 - \alpha \sigma > 0 \) \& \( \sigma \neq 0 \), the solutions of the auxiliary equation [1] are given by

\[ K^{f(\xi)} = \frac{-\beta}{\sigma} + \frac{\sqrt{\alpha \sigma - \beta^2}}{\sigma} \tanh \left( \frac{\xi}{2} \sqrt{\beta^2 - \alpha \sigma} \right) , \]  

(4)

\[ K^{f(\xi)} = \frac{-\beta}{\sigma} + \frac{\sqrt{\alpha \sigma - \beta^2}}{\sigma} \coth \left( \frac{\xi}{2} \sqrt{\beta^2 - \alpha \sigma} \right) . \]  

(5)
However, these solutions are not the solutions of the modified Khater method’s auxiliary equation and right solutions that have been used in “Math Meth Appl Sci. 2021;44:2682–2691” [2] are given by
For for $\beta^2 - 4\alpha \sigma < 0$ & $\sigma \neq 0$ by
\[ K_{f}(\xi) = -\frac{\beta}{2\sigma} + \frac{\sqrt{-(\beta^2 - 4\alpha \sigma)}}{2\sigma} \tan\left(\frac{\sqrt{-(\beta^2 - 4\alpha \sigma)}}{2}\xi\right), \] (6)
\[ K_{f}(\xi) = -\frac{\beta}{2\sigma} + \frac{\sqrt{-(\beta^2 - 4\alpha \sigma)}}{2\sigma} \cot\left(\frac{\sqrt{-(\beta^2 - 4\alpha \sigma)}}{2}\xi\right), \] (7)

and for $\beta^2 - 4\alpha \sigma > 0$ & $\sigma \neq 0$, the solutions of the auxiliary equation [3] are given by
\[ K_{f}(\xi) = -\frac{\beta}{2\sigma} - \frac{\sqrt{-(\beta^2 - 4\alpha \sigma)}}{2\sigma} \tan\left(h\left(\frac{\sqrt{-(\beta^2 - 4\alpha \sigma)}}{2}\xi\right)\right), \] (8)
\[ K_{f}(\xi) = -\frac{\beta}{2\sigma} - \frac{\sqrt{-(\beta^2 - 4\alpha \sigma)}}{2\sigma} \coth\left(h\left(\frac{\sqrt{-(\beta^2 - 4\alpha \sigma)}}{2}\xi\right)\right). \] (9)

The proof of these solutions’ correct can be given by

- \[ f'(\xi) = -\left(-4\alpha \sigma + \beta^2\right)\left(1 - \left(\tanh\left(0.5\sqrt{-(\beta^2 + \beta^2)}\xi\right)\right)^2\right) \frac{1}{4\sigma \ln(a)} \ln\left(-\frac{\beta}{\sigma} - \frac{\sqrt{-(\beta^2 + \beta^2)} + \beta^2}{2\sigma} \tanh\left(0.5\sqrt{-(\beta^2 + \beta^2)}\xi\right)\right)\] (10)
\[ + \frac{\sigma}{\ln(a)} a^{\ln(2)} a^{\ln(2)} + \frac{1}{\ln(a)} \left(-\frac{\beta}{\sigma} - \frac{\sqrt{-(\beta^2 + \beta^2)} + \beta^2}{2\sigma} \tanh\left(0.5\sqrt{-(\beta^2 + \beta^2)}\xi\right)\right)^{-1} \ln\left(-\frac{\beta}{\sigma} - \frac{\sqrt{-(\beta^2 + \beta^2)} + \beta^2}{2\sigma} \tanh\left(0.5\sqrt{-(\beta^2 + \beta^2)}\xi\right)\right)\] (11)

So that, by simple calculation, we can find:
\[ f'(\xi) - \frac{1}{\ln(a)} \left[\alpha a^{-f(\xi)} + \beta + \sigma a f(\xi)\right] = 0. \] (12)

- \[ 1 \ln(a) \left[\alpha a^{-f(\xi)} + \beta + \sigma a f(\xi)\right] = \left(\cot\left(0.5\sqrt{4\alpha \sigma - \beta^2}\xi\right)\right)^2 + 1 \left(-4\alpha \sigma + \beta^2\right) \frac{2}{2 \ln(a)} \left(\sqrt{4\alpha \sigma - \beta^2} \cot\left(0.5\sqrt{4\alpha \sigma - \beta^2}\xi\right) + \beta\right), \] (13)
\[ f'(\xi) = \left(\cot\left(0.5\sqrt{4\alpha \sigma - \beta^2}\xi\right)\right)^2 + 1 \left(-4\alpha \sigma + \beta^2\right) \frac{2}{2 \ln(a)} \left(\sqrt{4\alpha \sigma - \beta^2} \cot\left(0.5\sqrt{4\alpha \sigma - \beta^2}\xi\right) + \beta\right). \] (14)

So that, by simple calculation, we can find:
\[ f'(\xi) - \frac{1}{\ln(a)} \left[\alpha a^{-f(\xi)} + \beta + \sigma a f(\xi)\right] = 0. \] (15)
\[
\frac{1}{\ln(a)} \left[ \alpha a^{-f(\xi)} + \beta + \sigma a^{f(\xi)} \right] = -\left( \frac{\tanh(0.5 \sqrt{-4 \alpha \sigma + \beta^2} \xi) - 1}{2 \ln(a) \left( \sqrt{-4 \alpha \sigma + \beta^2} \tanh(0.5 \sqrt{-4 \alpha \sigma + \beta^2} \xi) + \beta \right)} \right) \] (16)

\[
f'(\xi) = \frac{-(-4 \alpha \sigma^2 + \beta^2) \left( \frac{\tanh(0.5 \sqrt{-4 \alpha \sigma + \beta^2} \xi)}{2 \ln(a) \left( \sqrt{-4 \alpha \sigma + \beta^2} \tanh(0.5 \sqrt{-4 \alpha \sigma + \beta^2} \xi) + \beta \right)} \right)^2 - 1}{2 \ln(a) \left( \sqrt{-4 \alpha \sigma + \beta^2} \tanh(0.5 \sqrt{-4 \alpha \sigma + \beta^2} \xi) + \beta \right)}. \] (17)

So that, by simple calculation, we can find:

\[
f'(\xi) - \frac{1}{\ln(a)} \left[ \alpha a^{-f(\xi)} + \beta + \sigma a^{f(\xi)} \right] = 0. \] (18)

\[
\frac{1}{\ln(a)} \left[ \alpha a^{-f(\xi)} + \beta + \sigma a^{f(\xi)} \right] = -\left( \frac{\coth \left( \frac{\sqrt{-4 \alpha \sigma + \beta^2}}{2} \xi \right) - 1}{2 \ln(a) \left( \sqrt{-4 \alpha \sigma + \beta^2} \coth \left( \frac{\sqrt{-4 \alpha \sigma + \beta^2}}{2} \xi \right) + \beta \right)} \right) \] (19)

\[
f'(\xi) = \frac{(-4 \alpha \sigma + \beta^2) \left( \frac{\coth \left( \frac{\sqrt{-4 \alpha \sigma + \beta^2}}{2} \xi \right)}{2 \ln(a) \left( \sqrt{-4 \alpha \sigma + \beta^2} \coth \left( \frac{\sqrt{-4 \alpha \sigma + \beta^2}}{2} \xi \right) + \beta \right)} \right)^2 - 1}{2 \ln(a) \left( \sqrt{-4 \alpha \sigma + \beta^2} \coth \left( \frac{\sqrt{-4 \alpha \sigma + \beta^2}}{2} \xi \right) + \beta \right)}. \] (20)

So that, by simple calculation, we can find:

\[
f'(\xi) - \frac{1}{\ln(a)} \left[ \alpha a^{-f(\xi)} + \beta + \sigma a^{f(\xi)} \right] = 0. \] (21)

### 2 Conclusion

In this scholarly endeavor, we have diligently addressed the unfounded claims presented by Elsayed M. E. Zayed and Shoukry El-Ganaini in their published paper, titled “Math. Meth. Appl. Sci. 2023;1–3.” Our aim has been to scrutinize their questionable scientific conduct. A careful examination of their paper [1] in comparison to our own article [2] reveals a noticeable departure from presenting accurate information. As a result, we have effectively highlighted the inaccuracies within the comments presented in [1], establishing their lack of veracity without ambiguity. It is indeed surprising that the peer reviewers of [1] did not identify these discrepancies. This work exemplifies our unwavering commitment to upholding the standards of rigorous scientific inquiry and integrity within the academic community.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

This work does not have any conflicts of interest

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