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Journal Name:	<u>British Journal of Mathematics & Computer Science</u>
Manuscript Number:	Ms_BJMCS_30543
Title of the Manuscript:	Trigonometric Solutions of the Lane-Emden Equation
Type of the Article	Original Research Article

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This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	1. It is undoubtedly true that Lane-Emden equation has exact analytical solution at $m=0$, 1 and 5. The solutions can be found in literature or even on google search, see for example: Analytic Solutions of the Lane-Emden Equation http://www.nicadd.niu.edu/~bterzic/PHYS652/Lecture_23.pdf Exact solution of Emden Equation https://en.wikipedia.org/wiki/Lane%E2%80%93Emden_equation#For_n_3D_0 Lane-Emden Differential Equation (Wolfram Web Resources) http://mathworld.wolfram.com/Lane-EmdenDifferentialEquation.html 2. The author(s) should mention in the abstract or through the paper, what is the advantage of his approach over that already published. Also comparison should be done. 3. Seeking approximate analytical solutions to Lane-Emden equation for polytropic indices different from 0, 1 and 5 is important in astrophysics.	1. References are given appropriately. Solutions in the internet are generally taken from the references [2,3,4,5] cited already. Classical solution for $m=0$ is $y(x)=1-x^2/6$ which is a parabole. In new case, we have a solution $y(x)=1-\sin^2(x)/6$ which is a oscillating. There is not <u>plagiarism issue</u> in the manuscript at all. Analytic Solutions the Lane-Emden Equation http://www.nicadd.niu.edu/~bterzic/PHYS652/Lecture_23.pdf is taken from Chandrasekhar's Book which I went through one by one also cite as reference [3]. Exact solution of Emden Equation https://en.wikipedia.org/wiki/Lane%E2%80%93Emden_equation#For_n_3D_0 is also taken from Horedt's Book which I went through one by one also cite as reference [5]. Solutions given in this book are also cite [3]. Reference [5] is all about Lane-Emden equation and applications. Lane-Emden Differential Equation (Wolfram Web Resources) http://mathworld.wolfram.com/Lane-EmdenDifferentialEquation.html is taken from Chandrasekhar's Book which I also cite as reference [3]. 2. <u>Advantages/Comparisons are made. I thank you for these comments.</u> I am seeking solutions which are oscillating. If there are solutions then this new case makes new differential equations probably more important than the classical Lane-Emden equation. This is the reason I took this approach. I left this thinking point to readers intentionally. New remarks related to comparison are added to manuscript to



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		underline the importance of new findings: $\backslash\begin{rem}$ Let $(\ref{2})$ hold. Then classical solution for $m=0$ is a parabole $y(x)=1-\frac{x^2}{6}$. In the new case, we have an oscillating solution $y(\theta)=1-\frac{\sin^2(\theta)}{6}$. $\backslash\end{rem}$ $\backslash\begin{rem}$ Let $(\ref{2})$ hold. The bound for classical solution is $y(x) \leq 1+\frac{ x ^2}{6}$. The new solution is bounded and oscillating around line $y(x)=\frac{7}{6}$ for any x since $y(x) \leq \frac{7}{6}$. The classical solution has a similar bound when x goes to zero. But when x gets bigger then the bound for the old one grows infinitely. $\backslash\end{rem}$ $\backslash\begin{rem}$ Let $(\ref{2})$ hold. Both the classical solution $y(x)=\frac{\sin(x)}{x}$ and the new solution $y(\theta)=\frac{\sin(\sin\theta)}{\sin\theta}$ are oscillating. It is easy to see that the classical one has infinitely many zeros when $x=k\pi$, k is an integer and differs from zero, and $-1\leq y(x)\leq 1$. However, the new one does not have any zeros and oscillating around line $y(x)=1$ for any x. If $x=k\pi$ where k is an integer, then the new one $y(x)\rightarrow 1$ by using L Hospital rule. $\backslash\end{rem}$ Abstract " With new approach, trigonometric solutions of the well-known Lane-Emden equation for $n=0,1$ are derived. To the best of author's knowledge these trigonometric solutions are not reported in the existing literature yet." changed as... With new approach, trigonometric solutions of the well-known Lane-Emden equation for $m=0,1$ (inadvertently I wrote $n=0,1$) are derived. To the best of author's knowledge these trigonometric solutions are not reported in the existing literature yet. $\backslash\section{Conclusion}(is improved)$ New trigonometric solutions, which are completely oscillating that is not reported yet in the literature, are derived for $m=0,1$. Equation $(\ref{16})$ which is not studied well and its connection to the LE is
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		reported. 3. That is right. I also made two corrections made by me inadvertently. The first one is in the abstract $n=0,1$ is replaced by $m=0,1$. The second one is in the second proof of Theorem 2.4: reference [8] is replaced by [7].
Minor REVISION comments		
Optional/General comments		