

## Review Form 1.6

Journal Name:	<a href="#">Asian Research Journal of Mathematics</a>
Manuscript Number:	<b>Ms_ARJOM_75356</b>
Title of the Manuscript:	<b>MATHEMATICAL MODELLING OF THE DYNAMICS OF COVID-19 DISEASE TRANSMISSION WITH VACCINATION</b>
Type of the Article	<b>Original Research Article</b>

### **General guideline for Peer Review process:**

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. To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

(<http://peerreviewcentral.com/page/manuscript-withdrawal-policy>)

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### PART 1: Review Comments

	<b>Reviewer's comment</b>	Authors are happy with the comments, observations and the recommendations of the Reviewer and necessary corrections have been made.
<b>Compulsory</b> REVISION comments	The article can be considered for publication after major corrections.	Okay
<b>Minor</b> REVISION comments	<p>Comments:</p> <ol style="list-style-type: none"> <li>1- The title can be written in a more attractive manner such as: "The impact of vaccination on COVID-19 disease transmission patterns in a human population: a theoretical analysis"</li> <li>2- In the abstract:</li> <li>3- <i>We construct a <b>simple</b> Mathematical model that describes the effect of vaccination on the...</i>  <i>Remove " simple"</i>  <i>R0 is defined later but not in the abstract</i>  <i>In the abstract R0 is not defined, authors should mention what is R0</i></li> <li>4- <i>the introduction is not acceptable at the moment</i>, authors could for example mention, the importance of modelling techniques in nature: from medicine to physics, these models are a good approximation to our understanding of entities dynamics, then cite few references in the introduction. For this purpose, authors can say for example:  <b><u>Nonlinear ordinary differential equations have been used to explore the complex mechanisms of the dynamics of various systems in multidisciplinary fields: for instance, they are used in economics {Insert refA}, quantum physics{Insert refB}, chaos{Insert refC}, medicine{Insert refD} and health diseases{Insert ref E}. These models aim to make an optimal predictive control of the parameters influencing the system dynamics.</u></b>  Then continue with models to explore covid 19.  References ti be inserted are:  refA: 1-On the development of variable-order fractional hyperchaotic <b>economic</b> system with a <b>nonlinear</b> model predictive controller H Jahanshahi, SS Sajjadi, S Bekiros, AA Aly - Chaos, Solitons &amp; Fractals, 2021 – Elsevier  2-<b>Economic</b> model predictive control of <b>nonlinear</b> systems using</li> </ol>	Comment accepted and considered

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	<p>a <b>linear</b> parameter varying approach</p> <p>F Karimi-Pour, V Puig... - ... Robust and <b>Nonlinear</b> ..., 2021 - Wiley Online Library</p> <p>Ref B:</p> <p>1-Nonlinear differential equations in physics and their soliton solutions</p> <p>Arthur R McGurn Published September 2015 • Copyright © 2015 Morgan &amp; Claypool Publishers</p> <p>2-Quantum control of an optically dense atomic medium: Pulse shaping in a v-type three-level system</p> <p>N Boutabba, H Eleuch Results in Physics 19, 103421</p> <p>3-Alpha Model: A Mathematical Modeling Approach Applied to an Air Quality Monitoring Network</p> <p>C El Aoun, N Boutabba, H Eleuch Applied Mathematics &amp; Information Sciences 9 (1), 27</p> <p>Ref C :</p> <p>Nonlinear Dynamics and Chaos Theory: Concepts and Applications Relevant to Pharmacodynamics <b>volume 18</b>, pages415–426 (2001)</p> <p>Ref D</p> <p><b>Nonlinear delay differential equations and their application to modeling biological network motifs</b> <b>volume 12</b>, Article number: 1788 (2021)</p> <p>Ref E</p> <p>Investigating a nonlinear dynamical model of COVID-19 disease under fuzzy caputo, random and ABC fractional order derivative</p> <p>Mati ur Rahman,<sup>a</sup> Muhammad Arfan,<sup>b</sup> Kamal Shah,<sup>b</sup> and J.F. Gómez-Aguilar<sup>*,c</sup></p>	
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	<p>5- After point 4, authors should describe some models and their outcomes, at least one more paragraph should be added, there are many models, even more powerful than a simple ordinary differential equations: I cite the Volterra lotka model- which is a non linear model. See, ref:</p> <p>- <a href="#">An analytical study of the dynamic behavior of Lotka-Volterra based models of COVID-19</a></p> <p>- <a href="#">COVID-19: Modeling, prediction, and control</a></p> <p><a href="#">A Bani Younes</a>, <a href="#">Z Hasan</a> - Applied Sciences, 2020 - mdpi.com</p> <p>In this paragraph , we recommend the authors to cite these models while they are applied in covid 19 or any other health discipline.</p> <p>6- The model is clear and the stability analysis is correct however, I strongly recommend to replot the figures from 0-200</p> <p>7- The current model is based on ordinary differential equations and these equations don't describe the realistic behavior of the covid 19, it is recommended that authors put a note about this in the conclusion to open other possibilities for a better description of the virus.</p>	
<b>Optional/General</b> comments		

## PART 2:

	<b>Reviewer's comment</b>	Authors agree with the Reviewer and required corrections have been made
<b>Are there ethical issues in this manuscript?</b>	<p><i>(If yes, Kindly please write down the ethical issues here in details)</i></p> <p>No</p>	