

## Response to Review-Report-Section-II-Ch-03-1

### General Remarks and Observations

*We know that that in viscoelasticity the fractional order introduces dissipation and proper creep and relaxation behavior. What is the physical process in the case of the epidemic equations? A sentence in the Introduction will be enough.*

We added the following sentence

When fractional order derivatives are used in epidemic models, they modify the duration, peaks of infected and dead individuals per day and number of casualties in the population.

*Indicate the end of the epidemic in the table.*

The end of the epidemic is defined as the day in which the number of infected individuals is smaller than one. This date makes sense only for the classical SEIR model, for the fractional order SEIR model the date has no sense due to the extremely extended period of the epidemic predicted by the simulations.

*For instance, when you report an incubation period of 3 in Table 1. This is actually the incubation period or the incubation period power ?. In all the tables you should give the real incubation period, e.g.  $(\epsilon^{-1})^\nu = 3^\nu$ . This 3 is correct. Do the same for all the other parameters. Then, in ALL the tables there is no need to indicate the power, only in the equations.*

The Table is fixed.

*Conclusions section. Write one, even if short.*

A new Section with Conclusions is included

### Minor points:

#### Abstract,

*6th line: there are two the*

Done

*$N_0$  is not defined and in validation has a different symbol.*

Done

#### Introduction

*(page 2), First paragraph, 5th line: still increasing at July 15th: I assume that you are updating the data. This should change after the update.*

This paragraph is fixed using the updated results

*page 2 I see that you assume 100 infectious initially. What happens if you change this number?*

We added the following paragraph at the end of subsection 4.2:

**GABY: completar esto**

Concerning the chosen value of initially infectious  $I(0)$ . The figures are not included for brevity.

*Last paragraph, last line: I think that dead individuals is dead individuals per day*

Done

**Section 2 The Caputo derivative and initial value problems (page 3)**

*first line: Replace  $D_c^\nu(u(t))$  by  $D_c^\nu(u(t))$  (remove parenthesis)*

Done

*Eq. (2): Replace  $D_c^\nu(f(t))|_{t_{n+1}}$  by  $D_c^\nu(f(t))|_{t_{n+1}}$  ; these expressions have an additional parenthesis*

Done

**Section 3 The classical and fractional-order SEIR models**

*(page 4) first line of Eq.(6):  $\lambda^\nu$  should be  $\mu^\nu N$  ;*

*Eq.(7):  $\mu^\mu$  should be  $\mu^\nu$ .*

Done

**Subsection 4.1 Validation of the GMMP algorithm**

*(page 5) first paragraph, 2nd line: fractional orders  $\nu = 1, 0.9$  and  $0.8$  is = 0.9 and 0.8?*

*Yes, fixed*

**Section 5 Analysis of the COVID-19 epidemic in the RMBA**

*(page 9): As mentioned above, update the analysis using data at least up to July 31st. Therefore update all the dates.*

*All dates were updated, the analysis is done using data until September 22th, 2020 (Section 5 is now Subsection 4.2)*

*Moreover, the authors should include an analysis of variations in the results associated with changes in the initial number of infected individuals;*

**Gaby escribir este paragraph :**

*As indicated in the General Remarks and Observations a paragraph is included at the end of Subsection 4.2*

*(page 10) 3rd paragraph, line 3: Complete the sentence shows a decay of the in the simulated curves;*

Done

*(page 14) last sentence, fix and the peak infected individuals and number of casualties increase*

*Done*

## **6 Appendix**

*(page 16) All lines of Eq.(13):  $b_{j,n+1}$  by  $b_{j,n+1}$*

*Done*

*(page 17) All lines of Eq.(14):  $f_j^\nu(S_{n+1}^p, E_{n+1}^p, I_{n+1}^p, R_{n+1}^p))$ ; there are additional parenthesis.*

*Done*

*(page 17): Update reference [2]*

*Done*