Reviewer: 1  
  
Comments to the Corresponding Author  
This study estimated bias in modelled sprint parameters using different correct methods. This is a very nice study with clear practical applications. I think the equations will be heavily utilised by sprint researchers and practitioners. I have only minor comments and clarifications.

Thank you for taking the time to review this manuscript. I hope that the proposed models in this study will be applied by sprint researchers and practitioners. There is still work to be done to validate these models, as alluded to in the Discussion section of this manuscript, and this study is a needed first step to validate these models using computer simulation

**Abstract**  
L14: Remove “the”.

The abstract is now rewritten, and this error has been corrected.

Line 21: The abbreviations TC and FD need to be explained in the abstract.

Thank you for pointing out this. This is now corrected.  
  
**Introduction**  
P2 L47: The word “frequently” is not necessary.

Due to not providing the line numbers in the original submission, I am hoping you are referring to the line that is now corrected and states: “Multiple gates are frequently placed at different distances to capture split times (e.g., 10, 20, 30, and 40 m), which can now be incorporated into the method for determining sprint mechanical properties (Samozino et al. 2016; Morin et al. 2019)”

P3 L26-29: “Note that TAU, given Equation 1, is the time required to reach a velocity equal to 63.2% of MSS.” The citation you provided earlier, Furusawa et al. (1927), states that TAU or a (as originally described in Furusawa), is “the total time-lag due to inertia acting up to the moment when the maximum velocity has been attained”. Why are your descriptions different? From modelling several data sets, the 63.2% value is correct.

This line is added to help interpret the value of TAU. For example, if TAU is 1.1 s, it can be interpreted that the athlete needs 1.1 seconds from the sprint initiation to reach 63.2% of MSS. An additional derived parameter that can also be reported is the time to reach 90, 95, or 99% of MSS, but for the purpose of this manuscript, I haven’t mentioned them. This line is now changed and states: “Note that TAU, given Equation 1, can be interpreted as the time required to reach a velocity equal to 63.2% of MSS.”

P4 L8-16: This is a very useful equation. This will be very helpful to sprint researchers and practitioners. Has this appeared / been used in the literature previously?

Do you refer to equation 4? If so, it has been utilized in Vescovi JD, Jovanović M. (2021) and Jovanović and Vescovi (2022). I have added these references, and now the manuscript states: “To estimate model parameters using split times, distance is a predictor, and time is the outcome variable; hence, Equation 4 takes the form of Equation 5 (Vescovi and Jovanović 2021; Jovanović and Vescovi 2022).”

P4 L17: Give a brief explanation for Lambert’s W function. This will not be common to many researchers and practitioners.

I have updated the explanation for the Lamber’s W function, and now it states: “W in Equation 5 represents Lambert’s W function, which is defined to be the multivalued inverse of the function f(w)=we^w (Corless et al. 1996; Goerg 2022).”

The additional reference provided is the following:

Corless RM, Gonnet GH, Hare DEG, Jeffrey DJ, Knuth DE. 1996. On the LambertW function. Adv Comput Math 5(1):329–359. https://doi.org/10.1007/BF02124750

P4 L21-30: Excellent point, well made.

Thank you

P4 L30: Should be “scientists”.

It is now corrected and states: “To the best of my knowledge, scientists, researchers, and coaches have been performing short sprints modeling using the built-in solver function of Microsoft Excel”

P4/5 L56-5: “Compared to the built-in solver function of Microsoft Excel, the {shorts} package represents a more powerful, flexible …”. Is there any evidence to support the advantage of the {shorts} package, specifically regarding power?

Thank you for pointing to that wording, which refers to a more rich feature set. The wording is now changed and states: “Compared to the built-in solver function of Microsoft Excel, the {shorts} package represents a more feature-rich, flexible, transparent, and reproducible environment for modeling short sprints. It is used in this study to estimate model parameters.”

P6 L52: Figures were not included in the pdf and I could not open any of the individual figures so I cannot comment on them.

Sorry for this inconvenience. The full manuscript and the accompanying R code to generate it (Quarto Markdown format), as well as the figures, is available at the GitHub repository that can be found in the “Data availability statement” section of the manuscript.  
  
Discussion  
The discussion is very well done. The limitations and practical applications of the methods are appropriately discussed.

Thank you. I am very happy to see so many positive and encouraging comments that will certainly motivate me to extend our work in this field. I also hope that the introduced changes in response to reviewer 2 will further improve this manuscript.

Reviewer: 2  
  
Comments to the Corresponding Author  
<b>Comments to the Author</b>  
Thank you for the work you put into this manuscript. I understand the premise in what you have done. However, I think that the structure and writing style prevent the reader from fully understanding the application. There are some areas that need to be structured appropriately.   
  
Therefore, I have general and specific comments below which you may find useful when reviewing the manuscript.

Thank you for taking the time to review this manuscript. I also appreciate the constructive feedback that you have suggested, which I have used to structure the manuscript in a better format.   
  
<b>General Comments</b>  
Structurally, the introduction includes method-related information and doesn’t conform to the need to provide a relevant, concise, background to the topic area along with clear aims / objectives / research questions. Therefore, I suggest moving the method-related information to the methods and save the specific method- and result-related information for those sections. I suggest that the explanation of the method you are testing in your simulations doesn’t need explicit stating here in terms of all the equations, just an overview and the description of the actual equations should be within the methods   
In addition to the above, avoid short paragraphs / one-sentence paragraphs. Try to improve the conciseness and succinctness of this manuscript in general so you can highlight your work more effectively.

I have used these recommendations and restructured the manuscript.  
  
<b>Specific Comments </b>  
As the way the journal manuscript pdf that was auto-generated does not fully provide appropriate line numbers for reference I can’t reference specific line numbers in my feedback to you.

Sorry for this inconvenience.  
  
<b>Abstract</b>  
The abstract would benefit from a sentence outlining the suggested benefits or “so what” of the main findings.   
Also, as the abstract should be standalone in many ways where you use abbreviations which should be defined here.

The abstract is now completely rewritten, and the abbreviations are included.

<b>Introduction</b>  
Please refer to my general comment on the introduction section structure and consider the information that is communicated here.

This is now restructured, and the description of the method is moved out of the introduction to the Methods section. Additional passages are added to the Introduction that outlines the problem and the aim of the study in a clearer manner.  
  
Pg 5. I don’t understand why you refer to the three brothers as “twin” brothers – do you mean triplets or are you referring to something else?

This is now changed to “triplets” thorough manuscript.  
  
<b>Methods</b>  
Write the methods as a record of what was done so please write it in the past tense where appropriate (that is throughout the entire section).

Thank you for pointing to this error. This is now corrected.   
  
<b>Results</b>  
Please just report the findings. No interpretation is required here and there is some attempt to understand (e.g., referring to “surprising finding”). Save that for the discussion.

Thank you for correcting this rookie author mistake. This is removed and moved to the Discussion section.  
  
<b>Discussion</b>  
I think this section needs the most work and clarification for the reader. There is no thorough interrogation of the results of the simulations.   
Something to consider, is that what about discussing the comparison with actual measurement using force platforms for example to understand when the first movement is actually initiated and having a gold standard measurement of speed? I think this merits a thorough discussion here apart from the mention of using the models in those types of studies with real athletes. I think without this then the application of these models are questionable. I think it’s good that you mention you are considering a study of this nature in the future. That will be crucial to fully understanding the application of your model.

The discussion from the Results section is now correctly located in the Discussion section. In addition to these, I have discussed a potential study that aims to verify these theoretical findings on the effects of the flying start distance on the precision and sensitivity of the estimated sprint parameters. Please note that this study is part of the PhD project aiming to evaluate the two new models. I cannot agree more that a practical study involving real athletes using the gold standard measure of the sprint (in our case, the radar/laser gun) is needed to validate the proposed models. As explained in the Discussion, one such study is currently ongoing. Due to space restrictions, I could not go into further details. This simulation study is not enough to validate these models, but it is a step in that direction and provides expected values we can use to interpret the practical study in the future.   
  
<b>Figures</b>  
Figure 3’s caption would benefit from highlighting what the colours represent. They are identified within the other figures – therefore, please do something similar here.

To maintain alignment with other graphs, colors utilized for different models are the same. Since Figure 3 comprises “facets” (i.e., trellis plot), model labels are indicated on the right side of the plot. Adding labels like it was done in other plots would be redundant since this information is already available. Please see the figure below.

Chart

Description automatically generated  
  
<b>Tables</b>  
For ease for the reader, the tables would benefit from any abbreviation used being identified as a note under the table.

Thank you for this remark. I have expanded the caption of the tables as well as added notes to improve easier readability for the reader. This is done for figure captions as well, and I have included notes for figures, also. I will leave it to the Editor to remove Figure notes if not needed.