Type of the Paper (Article)

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**Abstract:** A single paragraph of about 200 words maximum. For research articles, abstracts should give a pertinent overview of the work. We strongly encourage authors to use the following style of structured abstracts, but without headings: (1) Background: Place the question addressed in a broad context and highlight the purpose of the study; (2) Methods: briefly describe the main methods or treatments applied; (3) Results: summarize the article’s main findings in broadest, widely-understandable, quantitative terms; (4) Conclusions: indicate the main conclusions or interpretations. The abstract should be an objective representation of the article and it must not contain results that are not presented and substantiated in the main text and should not exaggerate the main conclusions.

**Keywords:** keyword 1; keyword 2; keyword 3 (List three to ten pertinent keywords specific to the article yet reasonably common within the subject discipline.)

0. How to Use This Template

The template details the sections that can be used in a manuscript. Note that each section has a corresponding style, which can be found in the “Styles” menu of Word. Sections that are not mandatory are listed as such. The section titles given are for articles. Review papers and other article types have a more flexible structure.

Remove this paragraph and start section numbering with 1. For any questions, please contact the editorial office of the journal or support@mdpi.com.

1. Introduction

|  |  |
| --- | --- |
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**Figure 1.** This is a figure. Schemes follow the same formatting. Front Cover Images have proven impact on article usage metrics. **Wiley Publishers recently completed an analysis to compare key article usage metrics of articles with Front Cover Images against the average metric values of articles that published in the same issue. Since May 2021, and compared to articles from the same issue without, articles with a Cover Image average: 55% higher full text views on Wiley Online Library; and 31% higher Altmetric Attention scores. [https://authorservices.wiley.com/author-resources/Journal-Authors/Promotion/journal-cover-image.html]**

The introduction should brie**fly place the study in a broad context** and highlight why it is important. It should define the purpose of the work and its significance. The current state of the research field should be carefully reviewed and key publications cited. Please highlight controversial and diverging hypotheses when necessary. Finally, briefly mention the main aim of the work and highlight the principal conclusions. As far as possible, please **keep the introduction comprehensible to scientists outside your particular field of research.**

1.1. Review of the literature

References should be numbered in order of appearance and indicated by a numeral or numerals in square brackets—e.g., [1] or [2,3], or [4–6]. See the end of the document for further details on references.

1.2. State of the art benchmarks

The following list highlights the current state of the art developing deterministic artificial intelligence:

1. In 2021, reference [**Error! Reference source not found.**] illustrated reveals that deterministic artificial intelligence yields 4.8% lower mean and 211% lower standard deviation of tracking errors as compared to the best modeling method investigated (indirect self-tuner without process zero cancellation and minimum phase plant).
2. That same year, seeking to duplicate the results, Shah [**Error! Reference source not found.**] discerned deterministic artificial intelligence outperformed the model-following approach in minimal peak transient value by a percent range of approximately 2–70%, but model-following achieved at least 29% less error in input tracking than deterministic artificial intelligence. This result was declared surprising and not in accordance with the recently published literature, and the explanation of the difference was theorized to be efficacy with discretized implementations.
3. The following year, in 2022 Koo, et. al, [**Error! Reference source not found.**] in response to Shah’s recommended future research investigated the impacts of discretization (timestep) and numerical propagation on the deterministic artificial intelligence approach.
4. In **2023**, Menezes, et. al, [**Error! Reference source not found.**] investigated the residual feature of discretization methods to complement the work of Koo, where the first order hold method of discretization with a surprisingly large sample time of seven-tenths of second yields greater than sixty percent improvement over the results presented in the prequel literature. Seemingly deterministic artificial intelligence might be less susceptible to larger step sizes when using first order hold discretization.
5. Subsequently in **2023,** Wang, et, al. [**Error! Reference source not found.**] investigated necessary step sizes for discrete applications to approach the performance of the continuous application of deterministic artificial intelligence. The revealed error means were roughly approximate when the step size was reduced to 0.2 seconds.

1.3. Novelties presented

Numbered lists can be added as follows:

2. Materials and Methods

The Materials and Methods should be described with sufficient details to allow others to replicate and build on the published results. Please note that the publication of your manuscript implicates that you must make all materials, data, computer code, and protocols associated with the publication available to readers. Please disclose at the submission stage any restrictions on the availability of materials or information. New methods and protocols should be described in detail while well-established methods can be briefly described and appropriately cited.

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**Figure 2.** This is a figure. Schemes follow the same formatting.

Research manuscripts reporting large datasets that are deposited in a publicly available database should specify where the data have been deposited and provide the relevant accession numbers. If the accession numbers have not yet been obtained at the time of submission, please state that they will be provided during review. They must be provided prior to publication.

**Table 1.** Table of proximal variables and nomenclature 1

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable/acronym** | **Definition** | **Variable/acronym** | **Definition** |
|  |  |  |  |
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1 Such tables are offered throughout the manuscript to aid readability.

Theorem-type environments (including propositions, lemmas, corollaries etc.) can be formatted as follows:

**Theorem 1.** Example text of a theorem. Theorems, propositions, lemmas, etc. should be numbered sequentially (i.e., Proposition 2 follows Theorem 1). Examples or Remarks use the same formatting, but should be numbered separately, so a document may contain Theorem 1, Remark 1 and Example 1.

The text continues here. Proofs must be formatted as follows:

**Proof of Theorem 1.** Text of the proof. Note that the phrase “of Theorem 1” is optional if it is clear which theorem is being referred to. Always finish a proof with the following symbol. □

Interventionary studies involving animals or humans, and other studies that require ethical approval, must list the authority that provided approval and the corresponding ethical approval code.

2.1 Formatting of Mathematical Components

This is example 1 of an equation:

|  |  |
| --- | --- |
|  | (1) |

the text following an equation need not be a new paragraph. Please punctuate equations as regular text.

This is example 2 of an equation:

|  |  |
| --- | --- |
|  | (2) |

the text following an equation need not be a new paragraph. Please punctuate equations as regular text.

**Table 2.** Table of proximal variables and nomenclature 1

|  |  |  |  |
| --- | --- | --- | --- |
| **Variable/acronym** | **Definition** | **Variable/acronym** | **Definition** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

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3. Results

This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation, as well as the experimental conclusions that can be drawn.

3.1. Subsection

3.1.1. Subsubsection

Bulleted lists look like this:

* First bullet;
* Second bullet;
* Third bullet.

Numbered lists can be added as follows:

1. First item;
2. Second item;

The text continues here.

3.2. Figures, Tables and Schemes

All figures and tables should be cited in the main text as Figure 1, Table 1, etc.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  | **Table 3.** This is a table. Tables should be placed in the main text near to the first time they are cited.   |  |  |  |  | | --- | --- | --- | --- | | **Case** |  |  | **Cost, J** | | Rigid Body Optimal u\_ff | 0.68431 | 0.271 |  | | Ideal |  |  |  | | Time-delay input shaping | -6.4816 | 4.7099 |  | | PID w u\_ff | 0.031938 | 0.28865 |  | | Noisy sensors |  |  |  | | Ideal |  |  |  | | Noisy sensors |  |  |  | | Ideal |  |  |  | | Noisy sensors |  |  |  | |  | | Ideal | 0.98319 | 0.035261 | 7.1491 | | 38.6972 | | Noisy sensors | 0.98319 | 0.035261 | 7.1491 | | 38.6972 | | Ideal | 0.98319 | 0.035261 | 7.1491 | | 38.6972 |   1 Tables may have a footer. |
| **(a)** | **(b)** | **(c)** |

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**Table 4.** This is a table. Tables should be placed in the main text near to the first time they are cited.

|  |  |  |
| --- | --- | --- |
| **Title 1** | **Title 2** | **Title 3** |
| entry 1 | data | data |
| entry 2 | data | data 1 |

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**Figure 4.** This is a figure. Schemes follow another format. If there are multiple panels, they should be listed as: (**a**) Description of what is contained in the first panel; (**b**) Description of what is contained in the second panel. Figures should be placed in the main text near to the first time they are cited. A caption on a single line should be centered.

**Table 5.** This is a table. Tables should be placed in the main text near to the first time they are cited.

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| --- | --- | --- | --- |
| **Title 1** | **Title 2** | **Title 3** | **Title 4** |
| entry 1 \* | data | data | data |
| data | data | data |
| data | data | data |
| entry 2 | data | data | data |
| data | data | data |
| entry 3 | data | data | data |
| data | data | data |
| data | data | data |
| data | data | data |
| entry 4 | data | data | data |
| data | data | data |

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4. Discussion

Authors should discuss the results and how they can be interpreted from the perspective of previous studies and of the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be highlighted.

**Table 6.** Percent performance improvements.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Case** |  |  | **Runtime** | **Cost, J** |
| Ideal | -- | -- | -- | -- |
| Method 1 | -12% | -38% | +0.48% | -102% |
| Method 2 | -12% | -38% | +0.48% | -102% |
| Method 3 | -12% | -38% | +0.48% | -102% |
| Method 4 | -12% | -38% | +0.48% | -102% |
| **Method 5** | **-50%** | **-39%** | **+2.1%** | **-148%** |
| Method 6 | -12% | -38% | +0.48% | -102% |
| Method 7 | -12% | -38% | +0.48% | -102% |

1 Tables may have a footer.

4.1 Future research directions

5. Conclusions

This section is not mandatory but can be added to the manuscript if the discussion is unusually long or complex.

**Author Contributions:** “Conceptualization, X.X. and Y.Y.; methodology, X.X.; software, X.X.; validation, X.X., Y.Y. and Z.Z.; formal analysis, X.X.; investigation, X.X.; resources, X.X.; data curation, X.X.; writing—original draft preparation, X.X.; writing—review and editing, X.X.; visualization, X.X.; supervision, X.X.; project administration, X.X.; funding acquisition, Y.Y. All authors have read and agreed to the published version of the manuscript.” Please turn to the [CRediT taxonomy](https://img.mdpi.org/data/contributor-role-instruction.pdf) for the term explanation. Authorship must be limited to those who have contributed substantially to the work reported.

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**Data Availability Statement:** Data supporting reported results can be obtained by contacting the corresponding author.

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**Conflicts of Interest:** The authors declare no conflict of interest.

**Appendix A**

The appendix is an optional section that can contain details and data supplemental to the main text—for example, explanations of experimental details that would disrupt the flow of the main text but nonetheless remain crucial to understanding and reproducing the research shown; figures of replicates for experiments of which representative data is shown in the main text can be added here if brief, or as Supplementary data. Mathematical proofs of results not central to the paper can be added as an appendix.

**Appendix B**

All appendix sections must be cited in the main text. In the appendices, Figures, Tables, etc. should be labeled starting with “A”—e.g., Figure A1, Figure A2, etc.

References

References must be numbered in order of appearance in the text (including citations in tables and legends) and listed individually at the end of the manuscript. We recommend preparing the references with a bibliography software package, such as EndNote, ReferenceManager or Zotero to avoid typing mistakes and duplicated references. Include the digital object identifier (DOI) for all references where available.

Citations and references in the Supplementary Materials are permitted provided that they also appear in the reference list here.

In the text, reference numbers should be placed in square brackets [ ] and placed before the punctuation; for example [1], [1–3] or [1,3]. For embedded citations in the text with pagination, use both parentheses and brackets to indicate the reference number and page numbers; for example [5] (p. 10), or [6] (pp. 101–105).

1. Author 1, A.B.; Author 2, C.D. Title of the article. *Abbreviated Journal Name* **Year**, *Volume*, page range.
2. Author 1, A.; Author 2, B. Title of the chapter. In *Book Title*, 2nd ed.; Editor 1, A., Editor 2, B., Eds.; Publisher: Publisher Location, Country, 2007; Volume 3, pp. 154–196.
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