MANUSCRIPT TITLE: Efficient Digital Filter Design Using Horner's Rule Applied to Fused Multiply–Add Architectures on FPGA

JOB CODE: SAMPLE_1

Date: 23rd March 2026

Dear Author,

Thank you for choosing to work with Editage! This document will help you understand how to interpret the attached iThenticate report and give you recommendations for next steps.

OVERALL SIMILARITY INDEX (SI) SCORE	**3%***
HIGHEST SINGLE SOURCE OVERLAP	**1%****
RISK ASSESSMENT	***LOW RISK***

*Standard journals consider an overall SI score of <15% to be acceptable
**Standard journals consider a single source overlap of <5% to be acceptable

The following sections of your manuscript were not included while running the iThenticate® report:

- Author information
- References/Bibliography
- Acknowledgements
- Conflict of interest
- Funding statements

RISK ASSESSMENT: The manuscript is at LOW RISK for plagiarism because the overall SI score is <15%.

NEXT STEPS

- You do not need to take any action at this point to reduce overlapping text.

For further details on the largest text matches and guidance on reducing text similarity, refer to the following sections:

- **RESOURCES:** Guidance on reducing text similarity
- **LARGEST MATCHES:** Examples of large areas of text overlap that are especially concerning

Please note that under the Plagiarism Check service, we only highlight text that needs to be revised. We do not revise the content or suggest alternative phrasing.

We hope you find this information useful in improving your manuscript. We're happy to address any questions you may have on the report. Thank you for choosing Editage as your publication partner!

Best regards,
Editage Publication Support

RESOURCES

A. General approaches to reducing text similarity

To reduce text overlap, pay special attention to these issues:

1. **Large blocks of similar text, such as a whole sentence or a series of sentences within the same paragraph (more than 6 continuous overlapping words)**
   - **Technical words and phrases** – Please consider paraphrasing the 'description of procedures/methods' sections if these show high similarity. If these are standard phrases or procedure names that cannot be modified, you can choose to leave them as is and provide an explanation to the journal about why these should not be considered as contributors to the Similarity Index score.
   - **Summarize** – Write a condensed version of the text that highlights reference papers in *your* own words. A paragraph could be summarized down to a few lines.
   - **Rephrase** – Express ideas or arguments in your own words without changing the original meaning. This is typically the same length as the original text but written without using words from the original text. Again, the source should be appropriately cited.
   - **Quotation** – When writing verbatim text, this should be placed within quotation marks, even if it is a short (but unique) phrase and referenced appropriately. However, it is always preferable to summarize/paraphrase because using a direct quote indicates that the text is so powerful that would lose its meaning/impact if expressed in any other words.

2. **Repeated similarity to the same source(s), including your own previously published work**
   - Avoid using other people's ideas/texts/results.
   - Keep careful records of your sources when reviewing literature for writing. Using software such as EndNote® or Zotero® could be helpful for keeping track of and organizing your citations.
   - While writing, avoid referring directly to your sources (to prevent inadvertent copying).
   - All information/ideas that are not your own must be referenced.
   - It is acceptable for authors to re-use their copyrighted works if the previously published work is appropriately cited and approval for re-use from the previous publisher is obtained. However, it is considered unethical if the authors portray a previously published work as new, when it is not.

3. **A large relative percentage of similarity to a single paper (e.g., if the overall similarity index is only 5%, but the match for one source is 4%, a journal editor will likely still investigate closely)**
   - Use multiple literature sources to ensure diversity of content.
   - No single source should have a match of >5%; such instances will need to be rephrased or you will need to reference other literature that expresses a similar idea.

B. Additional resources for improving your manuscript

1. This Editage Insights article provides more information on how a high similarity index score can affect your manuscript: https://www.editage.com/insights/should-plagiarism-lead-to-retraction-in-all-circumstances

2. This short article on Editage Insights provides useful tips on reducing overlap between previously published research and your work: https://www.editage.com/insights/3-techniques-to-avoid-plagiarism-in-your-research-paper

3. A **paraphrase** is among the most popular types of so-called 'accidental plagiarism'. Hence, it's important to understand how to use it properly.

    - This infographic available on Editage Insights will provide a clear illustration of how to draw the line between paraphrasing and plagiarism: https://www.editage.com/insights/ward-off-plagiarism-how-to-paraphrase-writing

    - This 5-minute video on Editage Insights will teach you a few techniques that will help you paraphrase English text effectively: https://www.editage.com/insights/how-to-paraphrase-english-text-effectively

4. This webinar by Editage Insights on BrightTalk focuses on advanced concepts of revising the written word to improve logic, clarity and flow of sentences in paragraphs: https://www.brighttalk.com/webcast/9615/193733

LARGEST MATCHES

Some parts of the paper showed an exact match with text in other previously published sources. Below are some examples of such portions that will need revisions. Please go through the iThenticate report in detail to work on improving ALL areas of overlapping text, to help with reducing the overall SI score.

Horner's rule has seen extensive use in polynomial and rational function evaluation. Malone *et al.* demonstrated the performance benefits of FPGA-based Horner implementations in heterogeneous computing systems [4]. Meanwhile, Voronenko and Püschel analyzed the application of FMA architectures to linear transforms, showing how FMA structures can be used to derive efficient computational algorithms [5, 6].

2D filter structures have also been explored extensively. Researchers such as Ty and Venetsanopoulos studied efficient 2D filter implementations for real-time image processing [7], while Gnanasekaran focused on practical FPGA realizations of 2D filters [8].

Together, these studies highlight the increasing interest in structured arithmetic techniques and FPGA-based optimization for DSP applications. The present work builds upon these ideas by combining Horner's nested polynomial form with FMA operations to achieve further gains.

B. Digital Filters and Polynomial Representation

Digital filters can be categorized as either finite impulse response (FIR) or infinite impulse response (IIR) depending on whether their difference equation includes feedback terms.

A general digital filter with input $x(n)$ and output $y(n)$ can be written as:

$$y(n) = \sum_{m=0}^{M} a_m x(n-m) - \sum_{m=1}^{N} b_m y(n-m) \quad (1)$$

FIR filters exclude the recursive term and thus have:

$$y(n) = \sum_{m=0}^{M} a_m x(n-m) \quad (2)$$

Expressing (for FIR) the transfer function in the z-domain:

$$H(z) = a_0 + a_1 z^{-1} + a_2 z^{-2} + \cdots + a_M z^{-M} \quad (3)$$

This form requires multiple multiplications and additions.

C. Horner's Rule for Efficient Polynomial Evaluation

Horner's rule rewrites the polynomial as:

$$H(z) = a_0 + z^{-1}(a_1 + z^{-1}(a_2 + \cdots + z^{-1}(a_M))) \quad (4)$$

This nested representation reduces the number of multiplications from M to roughly M, improves numerical stability, and maps directly into pipelined hardware structures.

Thus, Horner's rule is well-suited for FPGA implementation.

Appendix 1: FREQUENTLY ASKED QUESTIONS

Q: Can you correct the plagiarism to reduce similarity index? Do you help rewrite and paraphrase the plagiarized texts and sentences?

A: As part of this service, we can help you identify the sentences which contain instances of overlapping text and advise you on steps that you can take to reduce the similarity index. However, the changes will have to be done by the author (in keeping with ethical guidelines). Therefore, we will not be able to help rewrite and paraphrase plagiarized texts and sentences.

Q: How will you check my document for plagiarism?

A: To check for Plagiarism, we use the software iThenticate. This software is widely used in Academia by researchers and publishers and is well known for its accuracy.

Q: Is there post service support?

A: Yes – if you have made revisions and would like us to recheck the SI of your manuscript, we can provide that to you. Please write to us!

Appendix 2: ADDITIONAL SUPPORT FROM EDITAGE

If you would like more specific support with reducing text overlap in your manuscript, our **SCIENTIFIC IMPACT PACK** service provides an in-depth content review and recommendations for improving your manuscript by a subject area peer reviewer. The expert reviewers will also highlight text matching previously published literature that needs your attention and provide suggestions on how you can address these.

Having published and peer-reviewed papers in major journals, our experienced reviewer panel understands and will help you eliminate major reasons for manuscript rejection, thereby greatly improving your chances of acceptance in an appropriate journal.

The service is designed to offer you an in-depth critique of your research, significantly improve the readability of your paper, and help you ensure that your journal submission meets the high standards of academic publishing. We customize the service for each paper by bringing together a team of top-journal peer reviewers, senior language editors from the industry and your field, and Editage's senior publication experts, whose goal is to support your academic success.

An example of a pack service workflow is provided at the end of this report.

If you would like to use this pack for assistance with managing text overlap or add certain components of the pack to your current services to improve the chances of publication of your manuscript, you can write to us at: *request@editage.com*

Please note that choosing this service is optional and at your discretion.

*Appendix 3: OTHER SERVICE OFFERINGS - Example pack with timelines**

This is an example of a publication support 'pack' that includes services to help improve scientific content and check for overlapping text, recommending appropriate journals, editing and formatting the manuscript, and submitting the manuscript to the selected target journal. You can choose to use these and many other services (including statistical check, statistical analysis, literature review, graphical abstract, etc.) as you see fit for your manuscript. We will be happy to customize a pack/service to your needs!