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RESEARCH ARTICLE

Manuscript title goes here

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| Article Information | Abstract |
| Received: 10 January 2025Revised: 23 April 2025Accepted: 19 May 2025AMS 2020 Classification:90B35, 90C11*(provide at least two classification codes,* [*see the link*](https://mathscinet.ams.org/mathscinet/msc/msc2020.html)*)* | Provide an abstract which should provide a concise and comprehensive summary of the research, clearly highlighting the purpose of the study, the methodology used, the key results obtained, and the main conclusions drawn. It must be self-contained and written in a clear, academic style, avoiding citations, abbreviations, and undefined technical terms. Authors should use past tense for methods and results, and present tense for conclusions. The abstract should not exceed 250 words based on the journal guidelines and must be accompanied by 3 to 6 relevant keywords that reflect the core themes of the paper. Fint type is Times New Roman and size is 9-punto with a single line spacing.**Keywords:** Artificial intelligence, machine learning, computational optimization, intelligent systems |

# Introduction

The manuscript must be prepared in a single-column page format where margins are 2.5 cm on all sides (top, bottom, left and right). Authors are encouraged to structure their papers clearly using *up to three levels* of subsections to enhance readability and organization. Headings should be consistently numbered and styled in accordance with the provided template.

The introduction should establish the context and motivation for the research by clearly explaining the background of the study and identifying the gap or problem in the existing body of knowledge that the research aims to address. It should begin with a broad overview of the topic and gradually narrow down to the specific focus of the paper. Authors are expected to briefly review the most relevant and up-to-date literature to position their work in relation to previous studies, highlighting both theoretical and practical relevance.

The introduction must explicitly state the research objectives, hypotheses, or research questions and clarify the rationale for the chosen approach. Additionally, the contribution of the study, whether methodological, empirical, or conceptual, should be clearly articulated to help readers understand its significance. The section should be logically structured and written in formal academic language, avoiding overly technical detail better suited for later sections. Authors should ensure clarity, coherence, and brevity, and avoid including results, lengthy literature reviews, or data interpretations in this section.

# Literature review

The literature review should provide a critical and focused overview of existing research relevant to the topic of the study. Authors are expected to identify key theories, concepts, and findings from prior work, highlighting how these have shaped the current understanding of the subject. The review should not merely summarize existing studies but should evaluate their strengths, limitations, and relevance to the research problem. It should also identify gaps, inconsistencies, or areas requiring further investigation, thereby establishing the foundation for the current study. Connections between previous research and the present study should be clearly articulated to justify the research objectives or hypotheses.

## First subtitle

The literature review must be structured logically, organized thematically or chronologically as appropriate, and written in a formal academic style. Citations should be accurate and up to date, and the section should avoid excessive detail or repetition. Authors should aim to demonstrate both the depth and breadth of their understanding of the topic while maintaining a clear focus on the research question.

## Second subtitle

Clearly identifying the research gap is a fundamental component of academic writing, as it establishes the need for the study and defines its originality. Authors should critically assess existing literature to pinpoint limitations, inconsistencies, or underexplored areas that justify the current research. The gap should not be vaguely stated but must be specific, evidence-based, and aligned with the study’s objectives. Once the gap is articulated, authors must clearly define the contributions of their work in addressing it. These contributions may be theoretical (e.g., developing new models or frameworks), methodological (e.g., proposing novel algorithms or experimental approaches), or practical (e.g., solving real-world problems or improving existing processes). Contributions should be distinct, measurable, and presented as an advancement beyond what is already known or published. This section should provide readers with a clear understanding of why the research matters and how it adds value to the academic community or applied practice.

# Methodology

The methodology section should provide a clear, detailed, and reproducible description of the research design, data sources, tools, and procedures used to conduct the study. Authors must explain the rationale for selecting specific methods and how they align with the research objectives. If the study involves mathematical modeling, all relevant equations should be presented clearly, with each variable and parameter defined upon first use. Assumptions underlying the models must be explicitly stated to ensure transparency. In studies involving computational methods or optimization techniques, the logic and structure of the algorithms should be illustrated through well-labeled flowcharts or pseudocode to enhance reader understanding. The flowcharts should reflect the step-by-step process of the algorithm, showing decision points and iterations where applicable. Authors should also discuss the computational tools or platforms used, as well as any validation or verification procedures applied. The section should be written in formal academic style, using precise and consistent notation. It is important that the methodology enables replication of the results and establishes the scientific rigor of the study.

## Equations

Equations must be numbered and aligned in the centre. Equation numbers must be unique and should not contain section number.

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| $$\left(x+a\right)^{n}=\sum\_{k=0}^{n}\left(\genfrac{}{}{0pt}{}{n}{k}\right)x^{k}a^{n-k}.$$ | (1) |

Use the format “Eq. (X)” to refer to a specific equation, such as Eq. (1) represents… etc.

## Tables and figures

### Tables

Each table should have a caption just above it and cited in the text. Vertical lines must be avoided. Table and caption should be centred.

Table 1. Insert table caption here.

|  |  |  |
| --- | --- | --- |
| Column 1 | Column 2 | Column 3 |
| Row 1 | XX | XX |
| Row 2 | XX | XX |
| Row 3 | XX | XX |

### Figures

Figures must be in a high resolution that each component can be read easily. Font type and size should be adequate and suitable with the remaining components of the manuscript.



Figure 1. Insert figure caption for each figure

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| (a) | (b) |

Figure 2. Example image caption for a combined image of (a) and (b)

Each table and figure must be cited within text. For example “Table 1 represents the data used for …” or “Figure 2(a) and Figure 2(b) depict the outcome of the …”.

# Experimental tests

The experimental tests section should provide a clear and detailed account of the procedures used to validate the proposed models, methods, or hypotheses through physical or simulated experiments. Authors should describe the experimental setup, including equipment, materials, measurement instruments, test conditions, and any relevant standards followed. The configuration and calibration of equipment should be specified to ensure repeatability. If multiple test scenarios or case studies are used, each should be described systematically. The design of experiments must be explained, including the selection of input variables, control factors, and performance metrics. When applicable, diagrams or photographs of the setup should be included to enhance clarity. Authors should also describe how data was collected, processed, and analyzed, including any software tools used. Experimental results should be presented in a structured manner, supported by tables, graphs, or charts as appropriate. Any sources of error, limitations of the test environment, or uncertainties in measurements should be acknowledged. The section should demonstrate how the experimental tests support or challenge the study’s theoretical framework or computational findings.

# Conclusions and future research

The conclusions should clearly summarize the main findings of the study, emphasizing how they address the research objectives and contribute to filling the identified gap. Authors should highlight the significance of the results for theory, practice, or policy, and underscore any novel insights or advancements made. In addition, this section should transparently acknowledge the study’s limitations to provide context for interpreting the results. Building on these insights, authors are encouraged to propose directions for future research, identifying unresolved questions, potential methodological improvements, or emerging areas of inquiry that could further develop the topic. This forward-looking perspective not only demonstrates the ongoing relevance of the research but also guides other scholars interested in advancing the field.

References should be numbered starting from “1” based on its appearance order in the manuscript and listed in the standard IEEE format in the References.

Examples of in-text citations:

"Young [1] has argued that..."

"...end of the line for my research [2]."

"This theory was first put forward in 1987 [3]."

"Several recent studies [4], [5], [15], [16] have suggested that...."

"For example, see [7]."

Every reference cited within text must be listed in the list of References and vice versa (every reference listed in the References must be cited within text).

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**Conflict of interest**

There is no conflict of interest to disclose.

**Author contributions**

Please outline the specific roles and responsibilities each author had in the research and preparation of the manuscript.

**Declaration of using AI tools**

The authors declare that they have not used any type of generative artificial intelligence for the writing of this manuscript, nor for the creation of images, graphics, tables, or their corresponding captions.

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