

PORTADA

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Disemination of Science and Research in Lagos de Moreno

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Contents

Chapter X. Authors' instructions for the EDIESCA conferences2

AREA X. TO BE DEFINED

Chapter X. Title of Your Chapter

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Abstract

The abstract should concisely summarize the motivation, methodology, main results, and conclusions of the manuscript. It must be self-contained: do not include references or displayed equations. Aim for 150–250 words.

Keywords: Keyword 1, Keyword 2, Keyword 3, Keyword 4.

1 Introduction

Provide the scientific background and motivation for your work. Review relevant prior work and cite it appropriately [exampleRef1]. State clearly what problem you address, why it is important, and what contribution this paper makes.

Abbreviations should be defined the first time they appear; for example, the Ordinary Differential Equation (ODE) approach is used in the following sections. Integers from one to ten are written in words: we tested five configurations using three sensors each.

2 Theoretical Background

Introduce the theoretical framework or system model. Reference established results with a citation [exampleRef2].

2.1 Subsection Heading

Subsection content goes here.

Subsubsection heading. Third-level headings run in with the paragraph text.

2.2 Using Lists

Numbered list example:

1. First item.
2. Second item.
3. Third item.

Bulleted list example:

- First item.
- Second item.
- Third item.

2.3 Mathematical Statements

Definition 2.1. A dynamical system is a tuple (X, T, ϕ) where X is the state space, T is the time domain, and $\phi : X \times T \rightarrow X$ is the evolution map.

Theorem 2.2. Under assumptions A1 and A2, the equilibrium point $x^* = 0$ is globally asymptotically stable.

Proof. Consider the Lyapunov function $V(x) = x^\top P x > 0 \forall x \neq 0$. Since $\dot{V}(x) < 0$, stability follows by Lyapunov's direct method. \square

Title to be defined

3 Equations

Displayed equations are numbered consecutively within each section and aligned flush right. A simple example:

$$\dot{x}(t) = Ax(t) + Bu(t), \tag{1}$$

where $x \in \mathbb{R}^n$ is the state vector, $u \in \mathbb{R}^m$ is the input, and A, B are constant matrices. Equation (1) is referenced by its label.

A multi-line equation using the `split` environment:

$$\begin{aligned} J(\theta) &= \sum_{k=1}^N \|y_k - \hat{y}_k(\theta)\|^2 \\ &= \|\mathbf{y} - \hat{\mathbf{y}}(\theta)\|^2. \end{aligned} \tag{2}$$

4 Proposed Approach

Describe your methodology, experimental setup, or algorithm here.

5 Figures and Tables

5.1 Figures

Figure 1 is a single-column figure inserted with a width of 80% of the text column.

When a figure has two parts, stack them with shared caption:

5.2 Tables

Table 1 is a single-column table with caption above.

Table 1: System parameters used in the experiments.

Parameter Set		
Symbol	Description	Value
k_p	Proportional gain	12.5
k_i	Integral gain	0.02
k_d	Derivative gain	0.35

A full-width (two-column) table uses the starred `table*` environment:

Table 2: Comparison of controller performance across test scenarios.

Scenario		Performance	
Test case	Controller	RMSE	Settling time (s)
Path A	PID	0.043	2.1
Path A	Proposed	0.017	1.3
Path B	PID	0.081	3.6
Path B	Proposed	0.029	2.0

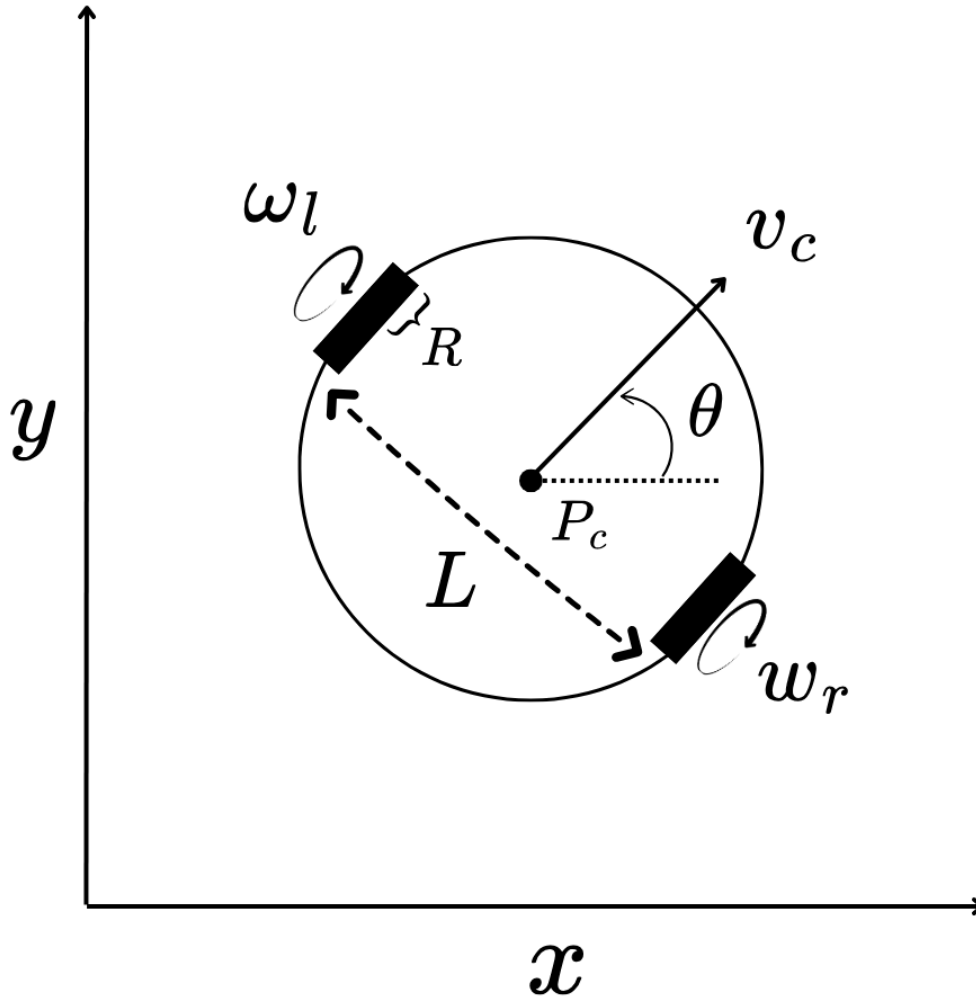


Figure 1: Caption placed directly below the figure. Describe what the figure shows, not just its label.

6 Results

Present your experimental or simulation results. Reference every figure and table by label before or shortly after it appears. Do not include raw data unless it directly supports your argument; use tables and figures instead.

7 Discussion

Interpret your findings and compare them with existing approaches [exampleRef1, exampleRef2]. Theorem 2.2 established the stability condition exploited in the controller design. Equation (2) was minimised using a gradient-free optimisation strategy, which explains the convergence behaviour visible in Figure 2.

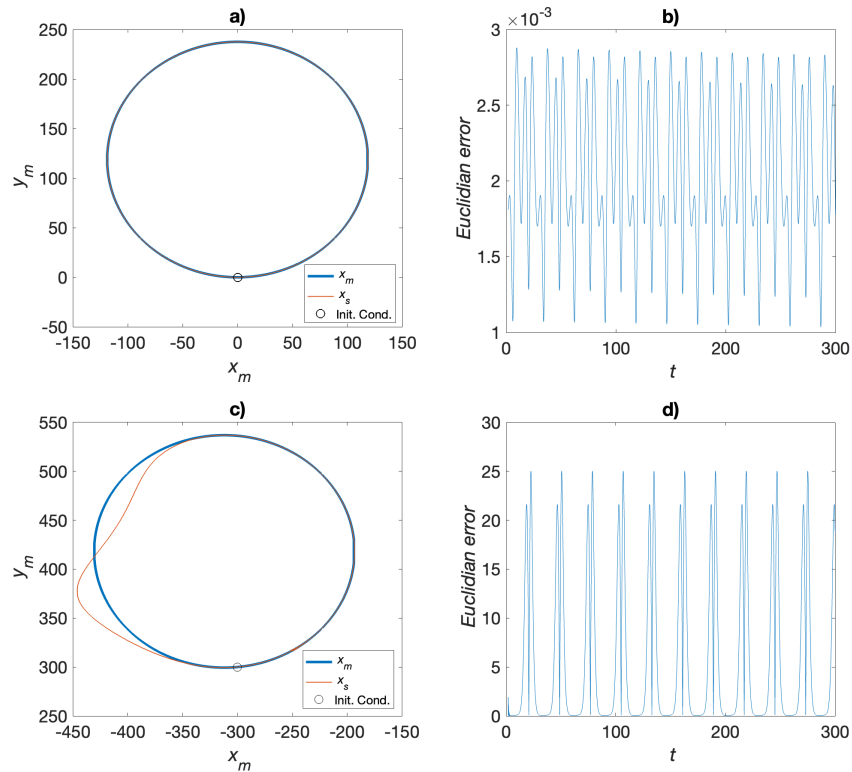


Figure 2: Two-part figure: (top) initial condition $\theta_0 = 0$; (bottom) initial condition $\theta_0 = 300$.

8 Conclusion

Summarise the main contributions and findings of the paper. State practical implications and, if appropriate, suggest directions for future work.

9 References description

The references must be in .bib format and will be compiled from the main Book Proceedings.tex file. Please do not insert them here.

It has been shown that a recurrent neural network with a Morlet wavelet activation function (also known as Recurrent Wavelet First-Order Neural Networks (RWFONNs)) is capable of identifying dynamical systems such as i) optical systems based on rare-earth doped optical fibers [1], ii) various chaotic systems (topologically different), while maintaining a fixed structure and synaptic values (both in integer and fractional-order schemes [2, 3, 4]); demonstrating its simplicity and versatility in identifying complex dynamics.

Acknowledgments

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References

- [1] Daniel A Magallón et al. "Control of multistability in an erbium-doped fiber laser by an artificial neural network: A numerical approach". In: *Mathematics* 10.17 (2022), p. 3140.

Title to be defined

- [2] Daniel Alejandro Magallón-García et al. "Identification of chaotic dynamics in jerky-based systems by recurrent wavelet first-order neural networks with a morlet wavelet activation function". In: *Axioms* 12.2 (2023), p. 200.
- [3] José Luis Echenausía-Monroy et al. "A recurrent neural network for identifying multiple chaotic systems". In: *Mathematics* 12.12 (2024), p. 1835.
- [4] José Luis Echenausía-Monroy et al. "Does a Fractional-Order Recurrent Neural Network Improve the Identification of Chaotic Dynamics?" In: *Fractal and Fractional* 8.11 (2024), p. 632.