

# Sending Secret Messages with Synchronized Chaotic Systems

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## **Abstract**

This paper introduces the basics of synchronization of chaotic systems. We will see how this can be applied to the field of communications as synchronized chaotic system can be used to send secret messages. Lastly, we show how resistant this method of encryption is to noise.

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# 1 Introduction

add introduction [CO93]

# 2 Theory of Synchronized Chaotic Systems

- for only the function that we are working with and show exponential convergence

**Theorem 1.**  $E(t) \rightarrow 0$

**Theorem 2.** *exponential convergence*

# 3 Numerical Experiments

based on circuit implementation [CO93] summary of what we are doing can mention something about precision numbers

## 3.1 Algorithm Implementation

algorithm and plots of convergence and noise and add pitfalls about machine epsilon

## 3.2 Testing Algorithm Against Noise

testing it against Gaussian noise (add some noise and see how bad it can get)

# 4 Discussion

why it is not that good for sending secret messages but there are better method for doing so (binary messages which is more robust to sending secret messages)

## References

- [CO93] Kevin M. Cuomo and Alan V. Oppenheim. “Circuit implementation of synchronized chaos with applications to communications”. In: *Phys. Rev. Lett.* 71 (1 July 1993), pp. 65–68. DOI: 10.1103/PhysRevLett.71.65. URL: <https://link.aps.org/doi/10.1103/PhysRevLett.71.65>.