

Title

Names

Date

1 Introduction

Why do we want to even get time series, what has already been done on this topic and what method are we going to consider in this report.

2 Mathematical Background

2.1 Problem description

Just some basic definitions and the mathematical description of the problem we want to solve.

2.2 Path signature

Motivation of using the path signature to represent paths, discuss some of its properties e.g. the universal approximation. Information is in the primer and the bachelor thesis.

2.3 Reservoir computing

Explain what reservoir computing is and how can we use the path signature in reservoir computing to increase the efficiency. See chapter 4 of the bachelor thesis.

2.4 Randomized signature

Motivation why it makes a lot more sense to use the randomized signature, see chapter 5 of the bachelor thesis. Now introduce the randomized signature as in "Universal randomised signatures for generative time series modelling". For sure we need to discuss proposition 8 (Universality of random feature neural networks) and chapter 3.

3 Numerical experiments

3.1 General setup

Explain what the code does in general terms. Input of data, the split of this data, what checks we do to verify the results, how we compute the confidence intervals. Also explain how we chose the hyper-parameters, add the final hyper-parameters to the table in the appendix.

3.2 Brownian motion

3.2.1 Setup

Definition of Brownian motion, specify the parameters and the seed.

3.2.2 Results

Show results, leave discussion for later.

3.3 Another example?

3.3.1 Setup

3.3.2 Results

4 Discussion and conclusion

Discuss the results and conclude about the method.

A Hyper-parameters

Table of Hyper-parameters for both experiments.