VILNIUS UNIVERSITY
FACULTY OF MATHEMATICS AND INFORMATICS
INSTITUTE OF COMPUTER SCIENCE
DEPARTMENT OF COMPUTATIONAL AND DATA MODELING

Bachelors Thesis

Implementation of application for visualization of regularities and randomness in data

Done by:
Audrius Baranauskas signature

Supervisor:
dr. Tadas Meškauskas

Vilnius
2020

Contents

Keywords

Pateikiamas terminų sąrašas (jei reikia)

Abstract

Santraukos tekstas rašto darbo kalba...

Santrauka

Darbo pavadinimas kita kalba

This is a summary in English...

Introduction

Signals can be observer all around us. For example, measuring the time taken between a weight-driven pendulum clock's ticks produces a signal. It does not require a great deal of effor to image how such a signal behaves. We would expect the clock's pendulum to swing back and forth, each time travelling a minutely shorter distance until the pendulum stops completely. Analysis of even a part of such a signal can help us determine the pendulum's position far into future.

Now consider a more complex siganl: the rates of a stock market. People have been analyzing this data for decades, grasping to predict its future state. For the scope of this paper, we defined the term signal processing as *the science of analyzing time-varying processes* [1].

In this thesis we analyzed the non-triviality of digital sygnals. Certain signals can be classified as simple (relatively trivial), like the aforementioned clock's pendulum. A more complex (non-trivial) signal would be the rates of a stock exchange.

1 Signal processing and Recurrence diagram

1.1 Signal processing

A signal is a function that conveys information about the behaviour of a system or attributes of some phenomenon [2].

Some signals are inherently simple such as the time taken between a weight-driven pendulum clock's ticks, the speed of a falling object or

2 Pirmasis skyrius

2.1 Pirmojo skyriaus poskyris

Pateikiamas 2.1 poskyrio tekstas. Vienas iš šaltinių [**?**]. Visas [**?**] turinys priklauso 2 skyriui.

2.1.1 Pirmojo skyriaus pirmo poskyrio poskyris

Pateikiamas trečio lygio poskyrio tekstas.

$$x = \sum_{i=1}^{N} m_i \tag{2.1}$$

Table 1. Lentelė ...

test	test
test	test

Sprendimas pristatomas 1 algoritme, o įgyvendinimas -- 1 išeities kode.

Algorithm 1. Algoritmas uždavinio sprendimui

Require:

Ensure:

a **and** b

Listing 1. Pagrindinio metodo žingsniai

```
1 public static void main(String args[]){
2 }
```

Conclusions and Recommendations

Išvados bei rekomendacijos.

Ateities tyrimų planas

Pristatomi ateities darbai ir/ar jų planas, gairės tolimesniems darbams....

References

[1] R.G. Lyons. *Understanding Digital Signal Processing*. Prentice Hall professional technical reference. Prentice Hall/PTR, 2004.

[2] R. Priemer. *Introductory Signal Processing*. Advanced Series In Electrical And Computer Engineering. World Scientific Publishing Company, 1990.

Appendices

Dokumentą sudaro du priedai: A priede ....

A Pirmojo priedo pavadinimas

Pirmojo priedo tekstas ...

B Antrojo priedo pavadinimas

Antrojo priedo tekstas ...