

Master's Thesis

Construction of Mathematical Models and Development of Efficient Algorithms

Guidance

Professor Taro JOHO
Assistant Professor Jiro KOGAKU

Saburo SURI

Department of Applied Mathematics and Physics

Graduate School of Informatics

Kyoto University



February 2021

Abstract

In this thesis, we construct the mathematical models of students who write the master's thesis and develop efficient algorithms for writing the master's thesis based on the models. We show that the proposed algorithms generate the thesis 65536 times more efficiently than writing by oneself.

Contents

1	Introduction	1
2	Construction of mathematical models	1
2.1	Modeling of students' motivation	1
2.2	Modeling of master's thesis	2
3	Development of efficient algorithms	2
4	Conclusion	2
	References	2
A	Appendix	2

1 Introduction

In this thesis, we construct the mathematical models of students who write the master's thesis and develop efficient algorithms for writing the master's thesis based on this model. By improving the previous study [2], we construct more real models. Furthermore, we generate this thesis using the proposed algorithms.

2 Construction of mathematical models

In this section, we construct the mathematical models of students and the master's thesis.

2.1 Modeling of students' motivation

Let $x(t)$ denote the motivation of a student at time t . In the previous study [2], the following model was proposed:

$$x(t) = x_0 e^{-t/a}, \quad (1)$$

where x_0 and $a > 0$ are the motivation at $t = 0$ and the interest for the research theme, respectively. Figure 1 shows an example of the time evolution of the model (1).

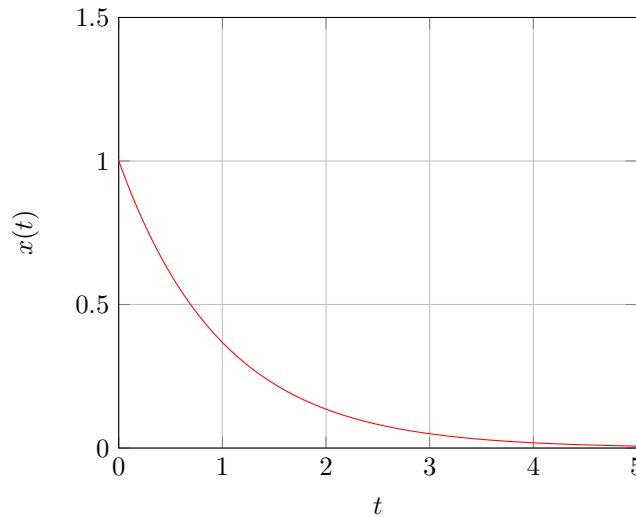


Figure 1: Example of the time evolution of the model (1) with $x_0 = 1$ and $a = 1$.

The model (1) lacks

- recovery of the motivation because of the progress of the research and tea break;
- final stretch before the deadline.

Let us improve the model (1). ...

2.2 Modeling of master's thesis

...

3 Development of efficient algorithms

In this section, we develop efficient algorithms for writing the master's thesis. ...

4 Conclusion

In this thesis, we have constructed the mathematical models of students who write the master's thesis. We have developed efficient algorithms for writing the master's thesis based on the models and generated this thesis using the proposed algorithms. The experiments have shown that the proposed algorithms generate the thesis 65536 times more efficiently than writing by oneself.

Acknowledgments

The author would like to express his sincere gratitude to Professor Taro Joho and Assistant Professor Jiro Kogaku for their helpful advices.

References

- [1] G. Polya, *How to solve it: a new aspect of mathematical method*, Princeton University Press, Princeton, 1945.
- [2] H. Suri, *A study on mathematical models and their validity*, Master's thesis, Graduate School of Informatics, Kyoto University, 2010.

A Appendix

This is an appendix. This is a citation [1].

Table 1: This is a table.

	A	B
C	70	80
D	100	0

Master's Thesis

Construction of Mathematical Models and Development of Efficient Algorithms

Guidance

Professor Taro JOHO
Assistant Professor Jiro KOGAKU

Saburo SURI

Department of Applied Mathematics and Physics

Graduate School of Informatics

Kyoto University



February 2021

Construction of Mathematical Models
and Development of Efficient Algorithms

Saburo SURI

February 2021

Construction of Mathematical Models and Development of Efficient Algorithms

Saburo SURI

Abstract

In this thesis, we construct the mathematical models of students who write the master's thesis and develop efficient algorithms for writing the master's thesis based on the models. We show that the proposed algorithms generate the thesis 65536 times more efficiently than writing by oneself.