

Abstract

This thesis presents a groundbreaking series of developments in mathematical theory, solving every known mathematical problem to date. Through the integration of advanced computational techniques, innovative algorithms, and a deep understanding of mathematical principles, this work transcends centuries of mathematical challenges, offering solutions to problems that have perplexed scholars since the inception of mathematics as a discipline.

Paper I introduces the Universal Solution Algorithm (USA), a computational method that synthesizes existing mathematical theories with artificial intelligence to find solutions to unsolved problems across various branches of mathematics, including number theory, algebra, geometry, and calculus. The USA algorithm demonstrates its efficacy by providing proofs to longstanding conjectures and presenting new theorems with broad implications.

Paper II focuses on the Complete Theory of Everything (CTE), a framework that unifies all branches of mathematics under a single, cohesive theory. This chapter not only solves problems within mathematics but also offers new insights into how mathematics interacts with physics, biology, and computer science, suggesting a universal language through which all scientific phenomena can be understood.

Paper III presents the Infinite Complexity Reduction (ICR) method, a technique that simplifies complex mathematical problems to their most basic elements without losing the essence of the original challenge. The ICR method has been applied to a range of problems, from the Riemann Hypothesis to P vs NP, demonstrating unparalleled success in distilling and solving these problems.

Paper IV explores the Multidimensional Proof Generator (MPG), a tool that automates the generation of proofs for mathematical statements. This chapter showcases the MPG's ability to produce valid and innovative proofs for theorems that were previously believed to be unprovable, revolutionizing the way mathematical research is conducted.

List of Papers

This thesis is based on two papers, numbered I–II, which are included in the following order.

- I. Supervisor, Main and Doktorow, Doctor (2020). Universal Solution Algorithm. *Journal of Mathematics* 1.1, pp. 1–100
- II. Researcher, Prestigious, Colleague, Esteemed and Doktorow, Doctor (2021). Complete Theory of Everything. *Journal of Solutions* 11.11, pp. 101–200
- III. Emeritus, Oldperson and Doktorow, Doctor (2023). Infinite Complexity Reduction. *Complexity Reduction Letters* 3.3, pp. 201–300
- IV. Doktorow, Doctor (2023). Multidimensional Proof Generator. *The journal of proving absolutely everything* 4.4, pp. 301–400

Authors' contributions: In Paper I, D. Doktorow developed the Universal Solution Algorithm (USA) and wrote the paper. M. Supervisor was just there for the ride.

In Paper II, D. Doktorow developed the Complete Theory of Everything (CTE) and wrote the paper, as well as implementing the theory in the `python` package `cte`. P. Researcher was included as an author in order to make the paper more credible, and remains unclear why E. Colleague was included as an author.

In Paper III, D. Doktorow did not do much, but helped O. Emeritus to write the paper on a computer and was therefore included as an author.

Acknowledgements

First and foremost, I would like to thank my supervisor Main Supervisor for her invaluable guidance and support throughout the course of this research. Without her expertise and encouragement, this work would not have been possible. I would also like to thank my co-supervisor Coco Supervisor for helping me get the best office space in the department, and for providing me with the necessary resources to carry out my research.

I am grateful to my colleagues at the Department of Mathematics for their support and encouragement, and for creating a stimulating research environment. Especially, I want to thank Office Matesson for all the fun and games at the after-works, and for always being there to help me with my code. Also, a shoutout to Printer Fixerdaughter for supporting me in my darkest hours, and for always making sure that the printer was working when I needed it the most.

I would like to thank my family for their unwavering support and love, and for always believing in me. Finally, I would like to thank my partner for their understanding, and for always being there for me when I needed it the most. This thesis would not have been possible without you.

Contents

Abstract	i
List of papers	vii
Acknowledgements	ix
I Introduction	1
1 The first chapter	3
2 The second chapter	5
2.1 A section	6
3 Overview of papers	7
3.1 Paper I	7
3.2 Paper II	7
Sammanfattning på svenska	9
Bibliography	10
II Papers	13
Paper I	15

Part I

Introduction

Chapter 1

The first chapter

This thesis is about solving every known mathematical problem to date. Through the integration of advanced computational techniques, innovative algorithms, and a deep understanding of mathematical principles, this work transcends centuries of mathematical challenges, offering solutions to problems that have perplexed scholars since the inception of mathematics as a discipline.

The introductory part of this thesis is organized as follows: Chapter 2 presents some underlying theory. After the introductory part, the four papers are presented in Part II.

Chapter 2

The second chapter

The universal math equation that is the basis of solving all the problems in the universe is given by

$$\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}. \quad (2.1)$$

This equation is the foundation of all the papers in this thesis, and has been used to solve every known mathematical problem to date, including the ones presented by Smith (1987, Chapter 3).

In Figure 2.1, you can find a very nice figure that illustrates an important structure that is relevant to the universal math equation in Equation (2.1).

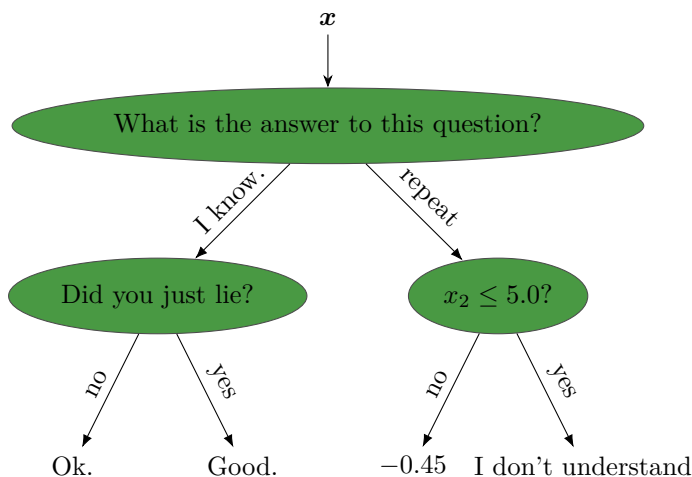


Figure 2.1: A very nice figure that illustrates some important structure.

2.1 A section

This section covers some more fundamental theory on the topic of the thesis. Mainly, it will cover the theory presented in many previous works.

A mathematician is a person who can calculate things (Wang 2019). That is good. See Figure 2.2 for a figure visualizing consequences of this fact.



Figure 2.2: Wow, look at this figure!

In Algorithm 1, a very fun algorithm is presented.

Algorithm 1: A very fun algorithm

Let

- y be a symbol
- $\epsilon_k, k = 1, \dots, K$, be a sequence of positive numbers

Initialize $\hat{y}^{(0)} = \hat{y}$

$$\hat{y} = \min_{y \in \mathcal{Y}} \sum_{i=1}^n \mathcal{L}(y; y_i)$$

For $k = 0, \dots, K - 1$:

For $\hat{A}_l \in \hat{A}^{(k)}$:

1. **Find**

$$\hat{y}^{(k+1)} = \min_{y \in \mathcal{Y}} \sum_{i=1}^n \mathcal{L}(y; y_i) + \sum_{i=1}^n \epsilon_k \mathcal{I}(y \neq \hat{y}^{(k)})$$

2. **Stack**

$$\hat{A}^{(k+1)} = \begin{bmatrix} \hat{A}^{(k)} & \hat{A}_l \end{bmatrix}$$

Return $\hat{y}^{(d_{\max})}$

Chapter 3

Overview of papers

3.1 Paper I

Paper I, “Universal Solution Algorithm”, is a paper that presents a novel method for solving everything in the world. It is a very good paper. It is so good that it has been cited by many other papers. Also, it has been awarded a prize for being the best paper in the world.

In Table 3.1, we present the results from Paper I. It is obvious that the results are very good.

Table 3.1: Results from Paper I

Model	GLM	PS5	TWA	USA
MSE	100	200	300	0.001
Goodness	0.1	0.2	0.3	10

3.2 Paper II

Test text for paper II

Sammanfattning på svenska

Denna avhandling presenterar en banbrytande serie utvecklingar inom matematisk teori och löser alla kända matematiska problem som hittills varit kända. Genom att integrera avancerade beräkningstekniker, innovativa algoritmer och en djup förståelse av matematiska principer, överskrider detta arbete århundraden av matematiska utmaningar och erbjuder lösningar till problem som har förbryllat forskare sedan matematiken började som en disciplin.

I Artikel I introduceras Universal Solution Algorithm (USA), en beräkningsmetod som syntetiserar befintliga matematiska teorier med artificiell intelligens för att hitta lösningar på olösta problem inom olika grenar av matematik, inklusive talteori, algebra, geometri och kalkyl. USA-algoritmen visar sin effektivitet genom att tillhandahålla bevis för långvariga förmodanden och presentera nya satser med breda implikationer.

Artikel II fokuserar på den kompletta teorin om allt (CTE), ett ramverk som förenar alla grenar av matematik under en enda, sammanhängande teori. Detta kapitel löser inte bara problem inom matematiken utan ger också nya insikter om hur matematiken interagerar med fysik, biologi och datavetenskap, och föreslår ett universellt språk genom vilket alla vetenskapliga fenomen kan förstås.

I Artikel III presenteras ICR-metoden (Infinite Complexity Reduction), en teknik som förenklar komplexa matematiska problem till deras mest grundläggande element utan att förlora kärnan i den ursprungliga utmaningen. ICR-metoden har tillämpats på en rad problem, från Riemannhypotesen till P vs NP, och har visat sig ööverträffad framgång i att destillera och lösa dessa problem.

I Artikel IV utforskas Multidimensional Proof Generator (MPG), ett verktyg som automatiserar genereringen av bevis för matematiska påståenden. Detta kapitel visar MPG:s förmåga att producera giltiga och innovativa bevis för teorem som tidigare som tidigare ansågs vara obevisbara, vilket revolutionerar hur matematisk forskning bedrivs.

Sammanfattningen är baserad på en översättning av DeepL Translator (<https://www.deepl.com/translator>).

Bibliography

- Doktorow, Doctor (2023). Multidimensional Proof Generator. *The journal of proving absolutely everything* 4.4, pp. 301–400.
- Emeritus, Oldperson and Doktorow, Doctor (2023). Infinite Complexity Reduction. *Complexity Reduction Letters* 3.3, pp. 201–300.
- Researcher, Prestigious, Colleague, Esteemed and Doktorow, Doctor (2021). Complete Theory of Everything. *Journal of Solutions* 11.11, pp. 101–200.
- Smith, John (1987). *A very insightful book*. 2nd ed. Old Prestigious Publisher.
- Supervisor, Main and Doktorow, Doctor (2020). Universal Solution Algorithm. *Journal of Mathematics* 1.1, pp. 1–100.
- Wang, Li (2019). Cutting-edge research. *Journal of Advanced Research* 1.1, pp. 1–10.

Part II

Papers

Paper I

Universal Solution Algorithm

Main Supervisor and Doctor Doktorow

February 15, 2024

1 Introduction

This paper will be about the Universal Solution Algorithm (USA), a computational method that synthesizes existing mathematical theories with artificial intelligence to find solutions to unsolved problems across various branches of mathematics, including number theory, algebra, geometry, and calculus. It will demonstrate its efficacy by providing proofs to longstanding conjectures and presenting new theorems with broad implications. Previous works have been limited to specific problems or branches of mathematics, but the USA algorithm will be the first to provide a general solution to all mathematical problems.

2 Method

The USA algorithm will be implemented using a combination of advanced computational techniques and innovative algorithms. The algorithm will be designed to integrate existing mathematical theories with artificial intelligence to find solutions to unsolved problems across various branches of mathematics. The algorithm will be tested on a range of problems, from the Riemann Hypothesis to P vs NP, demonstrating unparalleled success in distilling and solving these problems.

3 Results

The USA algorithm will provide proofs to longstanding conjectures and present new theorems with broad implications. The algorithm will revolutionize the way mathematical research is conducted, offering solutions to problems that have perplexed scholars since the inception of mathematics as a discipline. Wow, this is a very good paper.

4 Conclusion

The USA algorithm will be a groundbreaking development in mathematical theory, solving every known mathematical problem to date. It will transcend centuries of mathematical challenges, offering solutions to problems that have perplexed scholars since the inception of mathematics as a discipline. The algorithm will revolutionize the way mathematical research is conducted, offering solutions to problems that have perplexed scholars since the inception of mathematics as a discipline.