

Corrigenda for the Second Edition of *Simple Type Theory*

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Abstract

This document presents the errors, with corrections, we have found in the textbook *Simple Type Theory: A Practical Logic for Expressing and Reasoning About Mathematical Ideas, Second Edition*.

1 Introduction

The textbook *Simple Type Theory: A Practical Logic for Expressing and Reasoning About Mathematical Ideas, Second Edition* [3] is an introduction to *simple type theory* [2]. It presents a practice-oriented logic called *Alonzo* that is based on Alonzo Church's formulation of simple type theory known as *Church's type theory* [1]. Unlike traditional predicate logics, Alonzo admits undefined expressions. The book illustrates using Alonzo how simple type theory is exceptionally well suited for expressing and reasoning about mathematical ideas.

This document presents the errors, with corrections, we have found in *Simple Type Theory*. The errors are divided into two groups. *Semantic errors* are errors in what the text says, while *syntactic errors* are errors in how the text is formed. Examples of the former are false, ambiguous, misleading, incomplete, unfounded, contradictory, or overspecified statements, and examples of the latter are missing, unnecessary, or misused words; misspellings; grammatical mistakes; and incorrect terminology or notation.

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2 Semantic Errors

1. **Location:** Chapter 9, Section 9.5, p. 119, ll. 2–5.

Faulty Text: Paragraph containing

... either $T \models \mathbf{A}_o$ or $T \models \neg\mathbf{A}_o$... either $T \vdash_{\mathfrak{A}} \mathbf{A}_o$ or $T \vdash_{\mathfrak{A}} \neg\mathbf{A}_o$

Corrected Text: Added the following footnote to this paragraph:

Throughout this book we assume the phrase “either A or B ” means the exclusive disjunction of A and B .

2. **Location:** Chapter 10, Section 10.1, p. 132, ll. 2–3 and 6–7.

Faulty Text:

B is a nonempty set of values disjoint from A .

Corrected Text:

B is a nonempty set of values.

3. **Location:** Chapter 10, Section 10.2, p. 137, l. 29 and p. 138, l. 2.

Faulty Text:

where $\mathbf{B}_{\{\beta\}}$ is closed.

Corrected Text:

where β does not contain \mathbf{a} and $\mathbf{B}_{\{\beta\}}$ is closed.

4. **Location:** Chapter 14, Section 14.3, p. 184, l. 25.

Faulty Text:

If μ and ν are injective mappings, then Φ is injective.

Corrected Text:

If μ is an injective mapping from \mathcal{B}_1 to \mathcal{B}_2 and ν is an injective mapping from \mathcal{C}_1 to \mathcal{C}_2 , then Φ is injective.

5. **Location:** Chapter 14, Section 14.3, p. 199, l. 5.

Faulty Text:

GRP-to-dual-GRP is a normal injective translation by part 6 of Lemma 14.2.

Corrected Text:

It is not hard to see that GRP-to-dual-GRP is a normal injective translation.

3 Syntactic Errors

1. **Location:** Preface, p. xv, l. 2.

Faulty Text:

Jiang Fanping

Corrected Text:

Fanping Jiang

2. **Location:** Chapter 5, Section 5.2, p. 54, l. 4.

Faulty Text:

If φ, ψ agree on all free variables of \mathbf{A}_α

Corrected Text:

If φ, ψ agree on all free variables in \mathbf{A}_α

3. **Location:** Chapter 5, Section 5.5, p. 57, l. 16.

Faulty Text:

for some general model M for L

Corrected Text:

for some general model M that interprets Γ

4. **Location:** Chapter 6, Section 6.11, p. 79, l. 19.

Faulty Text:

$$g. (\mathbf{I} \mathbf{x} : \alpha . \mathbf{B}_o) = (\mathbf{I} \mathbf{x} : U_{\{\alpha\}} . \mathbf{B}_o).$$

Corrected Text:

$$g. (\mathbf{I} \mathbf{x} : \alpha . \mathbf{B}_o) \simeq (\mathbf{I} \mathbf{x} : U_{\{\alpha\}} . \mathbf{B}_o).$$

5. **Location:** Chapter 9, Section 9.4, p. 117, l. 20.

Faulty Text:

Richard Dekekind

Corrected Text:

Richard Dedekind

6. **Location:** Chapter 10, Section 10.1, p. 132, ll. 4 and 6.

Faulty Text:

is total, injective function

Corrected Text:

is a total, injective function

7. **Location:** Chapter 14, Section 14.1, p. 207, l. 2–3.

Faulty Text:

Name-of-target-theory is the name of the development D_2

Corrected Text:

Name-of-target-development is the name of the development D_2

8. **Location:** Chapter 14, Section 14.5, p. 217, l. 29–30.

Faulty Text:

developments in the graph can be interconnected with development modules

Corrected Text:

developments in the graph can be interconnected with development morphisms

9. **Location:** Appendix C, p. 282, l. 25–26.

Faulty Text:

P' be the result of replacing each occurrence of \mathbf{c}_α with $(\mathbf{x} : \alpha)$.

Corrected Text:

P' be the result of replacing each occurrence of \mathbf{c}_α in P with $(\mathbf{x} : \alpha)$.

10. **Location:** Appendix C, p. 287, l. 19.

Faulty Text:

free variables of \mathbf{C}_γ .

Corrected Text:

free variables in \mathbf{C}_γ .

11. **Location:** Bibliography, p. 295, l. 14.

Faulty Text:

The Mathematical Intelligencer, 43:78–87, 2021.

Corrected Text:

The Mathematical Intelligencer, 43(1):78–87, 2021.

References

- [1] C. Benzmüller and P. Andrews. Church’s type theory. In E. N. Zalta and U. Nodelman, editors, *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University, Spring 2024 edition, 2024. Available at <http://plato.stanford.edu/archives/spr2024/entries/type-theory-church/>.

- [2] W. M. Farmer. The seven virtues of simple type theory. *Journal of Applied Logic*, 6:267–286, 2008.
- [3] W. M. Farmer. *Simple Type Theory: A Practical Logic for Expressing and Reasoning About Mathematical Ideas*. Computer Science Foundations and Applied Logic. Birkhäuser/Springer, second edition, 2025.