

# Discovery in Mathematics: An Interdisciplinary Perspective



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### **Discovery in Mathematics: An Interdisciplinary Perspective**

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This book examines the nature of discovery of mathematics and how it is connected to notation, representation, and language. Using insights from modeling systems theory in semiotics and blending theory in cognitive science, it puts forward the idea that discovery is interconnected with representation, with one model providing insights into deeper structures hidden or implicit in the models themselves. It will look in particular at how diagrammatic reasoning undergirds how mathematicians think and how this, in itself, is a source of further ideas and conceptualizations in the field, leading to new models, new theories, branches, and so on. TABLE OF CONTENTS Introduction List of Figures 1 Discovery, Invention, Proof 1.1 Discovery 1.2 Invention 1.3 Proof 1.4 Mathematical Hermeneutics 2 Notation and Compression 2.1 Notation 2.2 Symbology 2.3 Binarism 2.4 Principle of Least Effort 3 Diagrams and Modeling 3.1 Diagrams 3.2 Existential Graphs 3.3 Layouts and the Rebus Principle 3.4 Models 4 Induction, Deduction, and Abduction 4.1 Mythos versus Lógos 4.2 Induction, Contradiction, and Exploration 4.3 Deduction 4.4 Abduction 5 Mathematics, Science, and Reality 5.1 Science 5.2 Falsification 5.3 Reality 5.4 Concluding Remarks

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186 SeitenKurzbeschreibungMarcel DanesiDepartment of Anthropology, University of Toronto, and Fields Institute for Research in MathematicalSciences

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#### TABLE OF CONTENTS

Introduction

List of Figures

- 1 Discovery, Invention, Proof
- 1.1 Discovery
- 1.2 Invention
- 1.3 Proof
- 1.4 Mathematical Hermeneutics
- 2 Notation and Compression
- 2.1 Notation
- 2.2 Symbology
- 2.3 Binarism
- 2.4 Principle of Least Effort

3 Diagrams and Modeling

- 3.1 Diagrams
- 3.2 Existential Graphs
- 3.3 Layouts and the Rebus Principle
- 3.4 Models

4 Induction, Deduction, and Abduction

- 4.1 Mythos versus Lógos
- 4.2 Induction, Contradiction, and Exploration
- 4.3 Deduction
- 4.4 Abduction

5 Mathematics, Science, and Reality

5.1 Science

5.2 Falsification5.3 Reality5.4 Concluding Remarks

References

Index

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