

Discrete and Continuous: Two sides of the same?

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Abstract

How deep is the dividing line between discrete and continuous mathematics? Basic structures and methods of both sides of our science are quite different. But on a deeper level, there is a more solid connection than meets the eye.

1 Introduction

There is a rather clear dividing line between discrete and continuous mathematics. Continuous mathematics is classical, well established, with a rich variety of applications. Discrete mathematics grew out of puzzles and then is often identified with specific application areas like computer science or operations research. Basic structures and methods of both sides of our science are quite different (continuous mathematicians use limits; discrete mathematicians use induction).

This state of mathematics at this particular time, the turn of the millennium, is a product of strong intrinsic logic, but also of historical coincidence.

The main external source of mathematical problems is science, in particular physics. The traditional view is that space and time are continuous, and that the laws of nature are described by differential equations. There are, of course, exceptions: chemistry, statistical mechanics, and quantum physics are based on at least a certain degree of discreteness. But these discrete objects (molecules, atoms, elementary particles, Feynman graphs) live in the continuum of space and time. String theory tries to explain these discrete objects as singularities of a higher dimensional continuum.

Accordingly, the mathematics used in most applications is analysis, the real hard core of our science. But especially in newly developing sciences, discrete models are becoming more

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the criticism of categories Richard Burdon Haldane Haldane (Viscount),1904 The Pathway to Reality : Stage the Second Richard Burdon Haldane Haldane (Viscount),1904 *The Logic of Hegel, Translated from the Encyclopædia of the Philosophical Sciences* Georg Wilhelm Friedrich Hegel,1874 **The Pathway to Reality** Richard Burdon Haldane Haldane (Viscount),1926 **The Logic of Hegel** Georg Wilhelm Friedrich Hegel,1892 Mathematical Reviews ,2002 Science of Logic Georg Wilhelm Friedrich Hegel,2022-11-13

Georg Wilhelm Friedrich Hegel s Science of Logic is a profound exploration of the nature and development of logic as a dialectical process Written in the early 19th century the text reflects Hegel s philosophical project to reconcile ideas of contradiction and unity where he meticulously dissects traditional logical structures Employing a dense yet methodical style Hegel transforms logic from a mere tool for scientific inquiry into an organic system that captures the dynamic and evolving nature of reality itself Notably the work offers a systematic account of concepts such as being essence and notion thus situating itself within the broader context of German Idealism Hegel a pivotal figure in Western philosophy was deeply influenced by the tumultuous socio political landscape of his time particularly the aftermath of the French Revolution His engagement with metaphysics and epistemology paved the way for this foundational work as Hegel sought to articulate a comprehensive framework that accounted for human thought and its evolution in the face of historical development His intellectual environment steeped in Enlightenment ideals yet marked by emerging contradictions directly shaped the themes present in Science of Logic This seminal work is recommended for readers keen on understanding the intricacies of Hegelian thought and its enduring impact on contemporary philosophy With its ambitious scope and innovative treatment of logic Science of Logic challenges readers to reconsider the relationship between thought and reality making it an essential read for students of philosophy logic and even the social sciences In this enriched edition we have carefully created added value for your reading experience A succinct Introduction situates the work s timeless appeal and themes The Synopsis outlines the central plot highlighting key developments without spoiling critical twists A detailed Historical Context immerses you in the era s events and influences that shaped the writing An Author Biography reveals milestones in the author s life illuminating the personal insights behind the text A thorough Analysis dissects symbols motifs and character arcs to unearth underlying meanings Reflection questions prompt you to engage personally with the work s messages connecting them to modern life Hand picked Memorable Quotes shine a spotlight on moments of literary brilliance Interactive footnotes clarify unusual references historical allusions and archaic phrases for an effortless more informed read *Math Instruction for Students with Learning Difficulties* Susan Perry Gurganus,2021-11-29

This richly updated third edition of *Math Instruction for Students with Learning Difficulties* presents a research based approach to mathematics instruction designed to build confidence and competence in preservice and inservice PreK 12 teachers Referencing benchmarks of both the National Council of Teachers of Mathematics and Common Core State

Standards for Mathematics this essential text addresses teacher and student attitudes towards mathematics as well as language issues specific mathematics disabilities prior experiences and cognitive and metacognitive factors Chapters on assessment and instruction precede strands that focus on critical concepts Replete with suggestions for class activities and field extensions the new edition features current research across topics and an innovative thread throughout chapters and strands multi tiered systems of support as they apply to mathematics instruction

Spatial Context Christopher Gold,2018-04-17 Many disciplines are concerned with manipulating geometric or spatial objects in the computer such as geology cartography computer aided design CAD etc and each of these have developed their own data structures and techniques often independently Nevertheless in many cases the object types and the spatial queries are similar and this book attempts to find a common theme

On the Teaching of Linear Algebra J.-L. Dorier,2005-12-27 This book presents the state of the art research on the teaching and learning of linear algebra in the first year of university in an international perspective It provides university teachers in charge of linear algebra courses with a wide range of information from works including theoretical and experimental issues

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Adopting the Track of Appearance: An Mental Symphony within **Discrete And Continuous Two Sides Of The Same**

In a global eaten by monitors and the ceaseless chatter of instantaneous communication, the melodic elegance and psychological symphony created by the prepared word usually disappear in to the background, eclipsed by the constant sound and interruptions that permeate our lives. However, situated within the pages of **Discrete And Continuous Two Sides Of The Same** an enchanting literary treasure overflowing with fresh thoughts, lies an immersive symphony waiting to be embraced. Crafted by a wonderful musician of language, this captivating masterpiece conducts viewers on a psychological journey, skillfully unraveling the hidden tunes and profound affect resonating within each cautiously crafted phrase. Within the depths of the touching analysis, we can discover the book is key harmonies, analyze its enthralling publishing type, and surrender ourselves to the profound resonance that echoes in the depths of readers souls.

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