Collatz Conjecture Proof Attempt

By: The illusion of the Fernando Rosas "self"

if odd, $\quad T(j) = \dfrac{3j+1}{2}$

if even, $\quad T(j) = \dfrac{j}{2}$

call the sequence of iterates $(j, T^1(j), T^2(j), T^3(j), T^k(j) \ldots)$ the trajectory of j

The Trajectory of j has three possible behaviors for all integers $j > 0$
Convergent trajectory, Divergent trajectory to infinity, and non-trivial cyclic trajectory
We will prove that the divergent and cyclic trajectories are impossible by contradiction.

Impossibility of divergence proof with only odds

Sub-proof of case with no division by 2
Suppose there exists a sequence of iterates that has no even element and diverges to infinity, then we can easily produce the results of such sequence

j

$\dfrac{3j+1}{2} \qquad = \qquad j + \frac{1}{2}(j+1) \quad = \qquad \frac{3^1}{2^1}(j+1) - 1$

$\dfrac{9j+5}{4} \qquad = \qquad 2j + 1 + \frac{1}{4}(j+1) \; = \; \frac{3^2}{2^2}(j+1) - 1$

$\dfrac{27j+19}{8} \qquad = \qquad 3j + 2 + \frac{5}{8}(j+1) = \; \frac{3^3}{2^3}(j+1) - 1$

$\dfrac{81j+65}{16} \qquad = \qquad 5j + 4 + \frac{1}{16}(j+1) = \; \frac{3^4}{2^4}(j+1) - 1$

$\dfrac{243j+211}{32} \qquad = \qquad 7j + 6 + \frac{13}{32}(j+1) = \; \frac{3^5}{2^5}(j+1) - 1$

...

The $T^k(j)$ term is equivalent to $j\frac{3^k}{2^k} + \frac{3^k - 2^k}{2^k} = \frac{3^k}{2^k}(j+1) - 1 = odd$

Consequently,
$j + 1$ must be a factor of 2^{k+1}, which implies $j + 1 \geq 2^{k+1}$
j cannot be a specific odd integer since $\lim_{k \to \infty} 2^{k+1} \to \infty$
Therefore, $T(j)$ with only odd elements cannot exist.

Conjecture And Proof

Dominic D. Joyce

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Conjecture and Proof Miklós Laczkovich,2022-08-11 The Budapest semesters in mathematics were initiated with the aim of offering undergraduate courses that convey the tradition of Hungarian mathematics to English speaking students This book is an elaborate version of the course on Conjecture and Proof It gives miniature introductions to various areas of mathematics by presenting some interesting and important but easily accessible results and methods The text contains complete proofs of deep results such as the transcendence of e the Banach Tarski paradox and the existence of Borel sets of arbitrary finite class One of the purposes is to demonstrate how far one can get from the first principles in just a couple of steps Prerequisites are kept to a minimum and any introductory calculus course provides the necessary background for understanding the book Exercises are included for the benefit of students However this book should prove fascinating for any mathematically literate reader   *Conjecture & Proof* Diane Driscoll Schwartz,1997   *Proof* Paul David Brown,2010

From Objecture to Proof Kenneth Milton,Howard Reeves,2002   **Proofs and Refutations** Imre Lakatos,1976 Proofs and Refutations is for those interested in the methodology philosophy and history of mathematics   Proof, Logic, and Conjecture Robert S. Wolf,1997-12-15 This text is designed to teach students how to read and write proofs in mathematics and to acquaint them with how mathematicians investigate problems and formulate conjecture   **A Proof of Alon's Second Eigenvalue Conjecture and Related Problems** Joel Friedman,2008 A d regular graph has largest or first adjacency matrix eigenvalue lambda_1 d Consider for an even d ge 4 a random d regular graph model formed from d 2 uniform independent permutations on 1 ldots n The author shows that for any epsilon 0 all eigenvalues aside from lambda_1 d are bounded by 2 sqrt d 1 epsilon with probability 1 O n tau where tau lceil bigl sqrt d 1 1 bigr 2 rceil 1 He also shows that this probability is at most 1 c n tau for a constant c and a tau that is either tau or tau 1 more often tau than tau 1 He proves related theorems for other models of random graphs including models with d odd   **Proofs and Refutations** Imre Lakatos,2015-10-08 Imre Lakatos s Proofs and Refutations is an enduring classic which has never lost its relevance Taking the form of a dialogue between a teacher and some students the book considers various solutions to mathematical problems and in the process raises important questions about the nature of mathematical discovery and methodology Lakatos shows that mathematics grows through a process of improvement by attempts at proofs and critiques of these attempts and his work continues to inspire mathematicians and philosophers aspiring to develop a philosophy of mathematics that accounts for both the static and the dynamic complexity of mathematical practice With a specially commissioned Preface written by Paolo Mancosu this book has been revived for a new generation of readers   *Explanation and Proof in Mathematics* Gila Hanna,Hans Niels Jahnke,Helmut Pulte,2009-12-04 In the four decades since Imre Lakatos declared mathematics a quasi empirical science increasing attention has been paid to the process of proof and argumentation in the field a development paralleled by the rise of computer technology and the mounting interest in the logical underpinnings of mathematics

Explanantion and Proof in Mathematics assembles perspectives from mathematics education and from the philosophy and history of mathematics to strengthen mutual awareness and share recent findings and advances in their interrelated fields With examples ranging from the geometrists of the 17th century and ancient Chinese algorithms to cognitive psychology and current educational practice contributors explore the role of refutation in generating proofs the varied links between experiment and deduction the use of diagrammatic thinking in addition to pure logic and the uses of proof in mathematics education including a critique of authoritative versus authoritarian teaching styles A sampling of the coverage The conjoint origins of proof and theoretical physics in ancient Greece Proof as bearers of mathematical knowledge Bridging knowing and proving in mathematical reasoning The role of mathematics in long term cognitive development of reasoning Proof as experiment in the work of Wittgenstein Relationships between mathematical proof problem solving and explanation Explanation and Proof in Mathematics is certain to attract a wide range of readers including mathematicians mathematics education professionals researchers students and philosophers and historians of mathematics **The Kepler Conjecture** ,2011-11-09 Curricular Resources and Classroom Use Gabriel J. Stylianides,2016-05-06 Curricular resources include the different kinds of materials digital or physical that teachers use in or for their teaching textbooks lesson plans etc and have a significant influence on students opportunities to learn At the same time teachers play a crucial role as interpreters of such materials so there is a complex relationship between curricular resources and their classroom use This book aims to bridge these rather disconnected but highly related programs of research by describing comparing and exemplifying new research approaches for studying in connected ways both curricular resources and their classroom use thereby supporting also investigation of the complex interplay between the two In addition to implications for research the book has implications for curriculum development and teacher education Specifically the book deepens understanding of how curriculum developers can better exploit the potential of curricular resources to support classroom work and how teacher educators can better support teachers to use curricular resources in the classroom Compact Manifolds with Special Holonomy Dominic D. Joyce,2000 This is a combination of a graduate textbook on Reimannian holonomy groups and a research monograph on compact manifolds with the exceptional holonomy groups G2 and Spin 7 It contains much new research and many new examples *Rewriting Techniques and Applications* Nachum Dershowitz,1989 Rewriting has always played an important role in symbolic manipulation and automated deduction systems The theory of rewriting is an outgrowth of Combinatory Logic and the Lambda Calculus Applications cover broad areas in automated reasoning programming language design semantics and implementations and symbolic and algebraic manipulation The proceedings of the third International Conference on Rewriting Techniques and Applications contain 34 regular papers covering many diverse aspects of rewriting including equational logic decidability questions term rewriting congruence class rewriting string rewriting conditional rewriting graph rewriting functional and logic programming languages lazy and parallel implementations termination issues

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mappings of groups building up to the proof of the Hall Paige conjecture The third part presents a comprehensive study of orthomorphism graphs of groups while the last part provides a discussion of Cartesian projective planes related combinatorial structures and a list of open problems Expanding the author s 1992 monograph Orthomorphism Graphs of Groups this book is an essential reference tool for mathematics researchers or graduate students tackling latin square problems in combinatorics Its presentation draws on a basic understanding of finite group theory finite field theory linear algebra and elementary number theory more advanced theories are introduced in the text as needed   **Science Progress in the Twentieth Century** ,1925   **ECAI 2004** Ramon López de Mántaras,Lorenza Saitta,2004 This is the Golden Age for Artificial Intelligence The world is becoming increasingly automated and wired together This also increases the opportunities for AI to help people and commerce Almost every sub field of AI had now been used in substantial applications Some of the fields highlighted in this publication are CBR Technology Model Based Systems Data Mining and Natural Language Techniques Not only does this publication show the activities capabilities and accomplishments of the sub fields it also focuses on what is happening across the field as a whole

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