

The Periodic Table Of Finite Simple Groups

A_1, A_2, A_3
1
1

Dynkin Diagrams of Simple Lie Algebras



A_1, A_2, A_3	A_4
A_4	$A_5(7)$
60	168
A_1, A_2, A_3	A_4
A_4	$A_5(8)$
168	252

A_4	A_5	A_6	A_7	A_8
$A_5(7)$	$A_6(8)$	$A_7(9)$	$A_8(10)$	$A_9(11)$
168	252	360	504	720
A_5	A_6	A_7	A_8	A_9
$A_6(8)$	$A_7(9)$	$A_8(10)$	$A_9(11)$	$A_{10}(12)$
252	360	504	720	1008

A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}
$A_8(10)$	$A_9(11)$	$A_{10}(12)$	$A_{11}(13)$	$A_{12}(14)$	$A_{13}(15)$	$A_{14}(16)$	$A_{15}(17)$	$A_{16}(18)$	$A_{17}(19)$	$A_{18}(20)$	$A_{19}(21)$	$A_{20}(22)$	$A_{21}(23)$
1008	1440	1920	2520	3240	4032	5040	6300	7920	9972	12700	16200	20736	26760
A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}
$A_8(10)$	$A_9(11)$	$A_{10}(12)$	$A_{11}(13)$	$A_{12}(14)$	$A_{13}(15)$	$A_{14}(16)$	$A_{15}(17)$	$A_{16}(18)$	$A_{17}(19)$	$A_{18}(20)$	$A_{19}(21)$	$A_{20}(22)$	$A_{21}(23)$
1440	1920	2520	3240	4032	5040	6300	7920	9972	12700	16200	20736	26760	34560

A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}
$A_8(10)$	$A_9(11)$	$A_{10}(12)$	$A_{11}(13)$	$A_{12}(14)$	$A_{13}(15)$	$A_{14}(16)$	$A_{15}(17)$	$A_{16}(18)$	$A_{17}(19)$	$A_{18}(20)$	$A_{19}(21)$	$A_{20}(22)$	$A_{21}(23)$
1920	2520	3240	4032	5040	6300	7920	9972	12700	16200	20736	26760	34560	44352
A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}
$A_8(10)$	$A_9(11)$	$A_{10}(12)$	$A_{11}(13)$	$A_{12}(14)$	$A_{13}(15)$	$A_{14}(16)$	$A_{15}(17)$	$A_{16}(18)$	$A_{17}(19)$	$A_{18}(20)$	$A_{19}(21)$	$A_{20}(22)$	$A_{21}(23)$
26760	34560	44352	56736	72576	92736	119760	156480	203160	264000	341280	440640	571200	737280

A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}
$A_8(10)$	$A_9(11)$	$A_{10}(12)$	$A_{11}(13)$	$A_{12}(14)$	$A_{13}(15)$	$A_{14}(16)$	$A_{15}(17)$	$A_{16}(18)$	$A_{17}(19)$	$A_{18}(20)$	$A_{19}(21)$	$A_{20}(22)$	$A_{21}(23)$
34560	44352	56736	72576	92736	119760	156480	203160	264000	341280	440640	571200	737280	952320
A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}
$A_8(10)$	$A_9(11)$	$A_{10}(12)$	$A_{11}(13)$	$A_{12}(14)$	$A_{13}(15)$	$A_{14}(16)$	$A_{15}(17)$	$A_{16}(18)$	$A_{17}(19)$	$A_{18}(20)$	$A_{19}(21)$	$A_{20}(22)$	$A_{21}(23)$
44352	56736	72576	92736	119760	156480	203160	264000	341280	440640	571200	737280	952320	1230000

A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}
$A_3(4)$	$A_4(5)$	$A_5(6)$	$A_6(7)$	$A_7(8)$	$A_8(9)$	$A_9(10)$	$A_{10}(11)$	$A_{11}(12)$	$A_{12}(13)$	$A_{13}(14)$	$A_{14}(15)$	$A_{15}(16)$	$A_{16}(17)$	$A_{17}(18)$	$A_{18}(19)$	$A_{19}(20)$	$A_{20}(21)$	$A_{21}(22)$
12	24	60	168	360	840	2520	7560	23040	72072	223920	705600	2217600	7056000	22392000	70560000	223920000	705600000	2239200000
A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}
$A_3(4)$	$A_4(5)$	$A_5(6)$	$A_6(7)$	$A_7(8)$	$A_8(9)$	$A_9(10)$	$A_{10}(11)$	$A_{11}(12)$	$A_{12}(13)$	$A_{13}(14)$	$A_{14}(15)$	$A_{15}(16)$	$A_{16}(17)$	$A_{17}(18)$	$A_{18}(19)$	$A_{19}(20)$	$A_{20}(21)$	$A_{21}(22)$
24	60	168	360	840	2520	7560	23040	72072	223920	705600	2217600	7056000	22392000	70560000	223920000	705600000	2239200000	7056000000

- Alternating Groups
 - Classical Orthogonal Groups
 - Classical Groups
 - Classical Symplectic Groups
 - Steinberg Groups
 - Ree Groups
 - Suzuki Groups and "Ree Groups"
 - Sporadic Groups
 - Cyclic Groups
- The group symbol is a reference to the ATLAS of Finite Groups. The number in parentheses is the order of the group. The number in brackets is the number of conjugacy classes of elements of order 2. The number in the superscript is the number of conjugacy classes of elements of order 3.

Minimal Symbol
Order

M_{23}	M_{22}	M_{21}	M_{20}	M_{19}	A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}	
24300	4400	6600	100800	165000	24	48	72	120	168	252	360	504	720	1008	1440	1920	2520	3240	4032	5040	6300	7920	9972	12700	16200

A_1	A_2	A_3	A_4	A_5	A_6	A_7	A_8	A_9	A_{10}	A_{11}	A_{12}	A_{13}	A_{14}	A_{15}	A_{16}	A_{17}	A_{18}	A_{19}	A_{20}	A_{21}	A_{22}	A_{23}	A_{24}	A_{25}	A_{26}	A_{27}	A_{28}	A_{29}	A_{30}	A_{31}	A_{32}	A_{33}	A_{34}	A_{35}	A_{36}	A_{37}	A_{38}	A_{39}	A_{40}	A_{41}	A_{42}	A_{43}	A_{44}	A_{45}	A_{46}	A_{47}	A_{48}	A_{49}	A_{50}	A_{51}	A_{52}	A_{53}	A_{54}	A_{55}	A_{56}	A_{57}	A_{58}	A_{59}	A_{60}	A_{61}	A_{62}	A_{63}	A_{64}	A_{65}	A_{66}	A_{67}	A_{68}	A_{69}	A_{70}	A_{71}	A_{72}	A_{73}	A_{74}	A_{75}	A_{76}	A_{77}	A_{78}	A_{79}	A_{80}	A_{81}	A_{82}	A_{83}	A_{84}	A_{85}	A_{86}	A_{87}	A_{88}	A_{89}	A_{90}	A_{91}	A_{92}	A_{93}	A_{94}	A_{95}	A_{96}	A_{97}	A_{98}	A_{99}	A_{100}																																																																																																																																		
24	48	72	120	168	252	360	504	720	1008	1440	1920	2520	3240	4032	5040	6300	7920	9972	12700	16200	20736	26760	34560	44352	56736	72576	92736	119760	156480	203160	264000	341280	440640	571200	737280	952320	1230000	1564800	2031600	2640000	3412800	4406400	5712000	7372800	9523200	12300000	15648000	20316000	26400000	34128000	44064000	57120000	73728000	95232000	123000000	156480000	203160000	264000000	341280000	440640000	571200000	737280000	952320000	1230000000	1564800000	2031600000	2640000000	3412800000	4406400000	5712000000	7372800000	9523200000	12300000000	15648000000	20316000000	26400000000	34128000000	44064000000	57120000000	73728000000	95232000000	123000000000	156480000000	203160000000	264000000000	341280000000	440640000000	571200000000	737280000000	952320000000	1230000000000	1564800000000	2031600000000	2640000000000	3412800000000	4406400000000	5712000000000	7372800000000	9523200000000	12300000000000	15648000000000	20316000000000	26400000000000	34128000000000	44064000000000	57120000000000	73728000000000	95232000000000	123000000000000	156480000000000	203160000000000	264000000000000	341280000000000	440640000000000	571200000000000	737280000000000	952320000000000	1230000000000000	1564800000000000	2031600000000000	2640000000000000	3412800000000000	4406400000000000	5712000000000000	7372800000000000	9523200000000000	12300000000000000	15648000000000000	20316000000000000	26400000000000000	34128000000000000	44064000000000000	57120000000000000	73728000000000000	95232000000000000	123000000000000000	156480000000000000	203160000000000000	264000000000000000	341280000000000000	440640000000000000	571200000000000000	737280000000000000	952320000000000000	1230000000000000000	1564800000000000000	2031600000000000000	2640000000000000000	3412800000000000000	4406400000000000000	5712000000000000000	7372800000000000000	9523200000000000000	12300000000000000000	15648000000000000000	20316000000000000000	26400000000000000000	34128000000000000000	44064000000000000000	57120000000000000000	73728000000000000000	95232000000000000000	123000000000000000000	156480000000000000000	203160000000000000000	264000000000000000000	341280000000000000000	440640000000000000000	571200000000000000000	737280000000000000000	952320000000000000000	1230000000000000000000	1564800000000000000000	2031600000000000000000	2640000000000000000000	3412800000000000000000	4406400000000000000000	5712000000000000000000	7372800000000000000000	9523200000000000000000	12300000000000000000000	15648000000000000000000	20316000000000000000000	26400000000000000000000	34128000000000000000000	44064000000000000000000	57120000000000000000000	73728000000000000000000	95232000000000000000000	123000000000000000000000	156480000000000000000000	203160000000000000000000	264000000000000000000000	341280000000000000000000	440640000000000000000000	571200000000000000000000	737280000000000000000000	952320000000000000000000	1230000000000000000000000	1564800000000000000000000	2031600000000000000000000	2640000000000000000000000	3412800000000000000000000	4406400000000000000000000	5712000000000000000000000	7372800000000000000000000	9523200000000000000000000	12300000000000000000000000	15648000000000000000000000	20316000000000000000000000	26400000000000000000000000	34128000000000000000000000	44064000000000000000000000	57120000000000000000000000	73728000000000000000000000	95232000000000000000000000	123000000000000000000000000	156480000000000000000000000	203160000000000000000000000	264000000000000000000000000	341280000000000000000000000	440640000000000000000000000	571200000000000000000000000	737280000000000000000000000	952320000000000000000000000	1230000000000000000000000000	1564800000000000000000000000	2031600000000000000000000000	264000000000000000

Finite Simple Groups

**Daniel Gorenstein, Richard
Lyons, Ronald Solomon**



Finite Simple Groups:

The Classification of the Finite Simple Groups Daniel Gorenstein, Richard Lyons, Ronald M. Solomon, 1994-11-18 The classification of the finite simple groups is one of the major feats of contemporary mathematical research but its proof has never been completely extricated from the journal literature in which it first appeared This book serves as an introduction to a series devoted to organizing and simplifying the proof The purpose of the series is to present as direct and coherent a proof as is possible with existing techniques This first volume which sets up the structure for the entire series begins with largely informal discussions of the relationship between the Classification Theorem and the general structure of finite groups as well as the general strategy to be followed in the series and a comparison with the original proof Also listed are background results from the literature that will be used in subsequent volumes Next the authors formally present the structure of the proof and the plan for the series of volumes in the form of two grids giving the main case division of the proof as well as the principal milestones in the analysis of each case Thumbnail sketches are given of the ten or so principal methods underlying the proof Much of the book is written in an expository style accessible to nonspecialists *Finite Simple Groups* Daniel Gorenstein, 2013-11-27 In February 1981 the classification of the finite simple groups D1 was completed representing one of the most remarkable achievements in the history of mathematics Involving the combined efforts of several hundred mathematicians from around the world over a period of 30 years the full proof covered something between 5 000 and 10 000 journal pages spread over 300 to 500 individual papers The single result that more than any other opened up the field and foreshadowed the vastness of the full classification proof was the celebrated theorem of Walter Feit and John Thompson in 1962 which stated that every finite group of odd order D2 is solvable D3 a statement expressible in a single line yet its proof required a full 255 page issue of the Pacific Journal of Mathematics 93 Soon thereafter in 1965 came the first new sporadic simple group in over 100 years the Zvonimir Janko group 1 to further stimulate the field To make the book as self contained as possible we are including definitions of various terms as they occur in the text However in order not to disrupt the continuity of the discussion we have placed them at the end of the Introduction We denote these definitions by D1 D2 D3 etc **The Classification of the Finite Simple Groups, Number 6** Daniel Gorenstein, Richard Lyons, Ronald Solomon, 1994 The classification of finite simple groups is a landmark result of modern mathematics This work presents critical aspects of the classification It provides the classification of finite simple groups of special odd type Theorems C_2 and C_3 It is suitable for graduate students and researchers interested in group theory *Finite Simple Groups* Daniel Gorenstein, 1982-04-30 In February 1981 the classification of the finite simple groups D1 was completed representing one of the most remarkable achievements in the history of mathematics Involving the combined efforts of several hundred mathematicians from around the world over a period of 30 years the full proof covered something between 5 000 and 10 000 journal pages spread over 300 to 500 individual papers The single result that more than any other opened up the field and

foreshadowed the vastness of the full classification proof was the celebrated theorem of Walter Feit and John Thompson in 1962 which stated that every finite group of odd order is solvable. A statement expressible in a single line yet its proof required a full 255 page issue of the Pacific Journal of Mathematics. Soon thereafter in 1965 came the first new sporadic simple group in over 100 years the Zvonimir Janko group J_1 to further stimulate the field. To make the book as self contained as possible we are including definitions of various terms as they occur in the text. However in order not to disrupt the continuity of the discussion we have placed them at the end of the Introduction. We denote these definitions by D_1, D_2, D_3 etc.

The Finite Simple Groups Robert Wilson, 2010-05-06 This book is intended as an introduction to all the finite simple groups. During the monumental struggle to classify the finite simple groups and indeed since a huge amount of information about these groups has been accumulated. Conveying this information to the next generation of students and researchers not to mention those who might wish to apply this knowledge has become a major challenge. With the publication of the two volumes by Aschbacher and Smith in 2004 we can reasonably regard the proof of the Classification Theorem for Finite Simple Groups usually abbreviated CFSG as complete. Thus it is timely to attempt an overview of all the non abelian finite simple groups in one volume. For expository purposes it is convenient to divide them into four basic types namely the alternating classical exceptional and sporadic groups. The study of alternating groups soon develops into the theory of permutation groups which is well served by the classic text of Wielandt and more modern treatments such as the comprehensive introduction by Dixon and Mortimer and more specialised texts such as that of Cameron.

Applying the Classification of Finite Simple Groups Stephen D. Smith, 2018-04-30 Classification of Finite Simple Groups CFSG is a major project involving work by hundreds of researchers. The work was largely completed by about 1983 although final publication of the quasithin part was delayed until 2004. Since the 1980s CFSG has had a huge influence on work in finite group theory and in many adjacent fields of mathematics. This book attempts to survey and sample a number of such topics from the very large and increasingly active research area of applications of CFSG. The book is based on the author's lectures at the September 2015 Venice Summer School on Finite Groups. With about 50 exercises from original lectures it can serve as a second year graduate course for students who have had first year graduate algebra. It may be of particular interest to students looking for a dissertation topic around group theory. It can also be useful as an introduction and basic reference. In addition it indicates fuller citations to the appropriate literature for readers who wish to go on to more detailed sources.

The Classification of the Finite Simple Groups, Number 9 Inna Capdeboscq, Daniel Gorenstein, Richard Lyons, Ronald Solomon, 2021-02-22 This book is the ninth volume in a series whose goal is to furnish a careful and largely self contained proof of the classification theorem for the finite simple groups. Having completed the classification of the simple groups of odd type as well as the classification of the simple groups of generic even type modulo uniqueness theorems to appear later the current volume begins the classification of the finite simple groups of special even type. The principal result of this volume is a

classification of the groups of bicharacteristic type i.e. of both even type and of p type for a suitable odd prime p . It is here that the largest sporadic groups emerge namely the Monster, the Baby Monster, the largest Conway group and the three Fischer groups along with six finite groups of Lie type over small fields, several of which play a major role as subgroups or sections of these sporadic groups.

The Classification of the Finite Simple Groups, Number 8 Daniel Gorenstein, Richard Lyons, Ronald Solomon, 2018-12-12. This book completes a trilogy Numbers 5, 7 and 8 of the series *The Classification of the Finite Simple Groups* treating the generic case of the classification of the finite simple groups. In conjunction with Numbers 4 and 6 it allows us to reach a major milestone in our series: the completion of the proof of the following theorem.

Theorem O Let G be a finite simple group of odd type all of whose proper simple sections are known simple groups. Then either G is an alternating group or G is a finite group of Lie type defined over a field of odd order or G is one of six sporadic simple groups.

Put another way, Theorem O asserts that any minimal counterexample to the classification of the finite simple groups must be of even type. The work of Aschbacher and Smith shows that a minimal counterexample is not of quasi-thin even type while this volume shows that a minimal counterexample cannot be of generic even type modulo the treatment of certain intermediate configurations of even type which will be ruled out in the next volume of our series.

Theory of Finite Simple Groups Gerhard O. Michler, 2006-09-21. This book provides the first representation theoretic and algorithmic approach to the theory of abstract finite simple groups. It presents self-contained proofs of classical and new group order formulas and a new structure theorem for abstract finite simple groups. This and the famous Brauer-Fowler theorem provides the theoretical background for the author's algorithm which constructs all finite simple groups G having a 2-central involution z with a given centralizer $C_G(z) = H$. The methods presented are designed for the construction of matrix representations, permutation representations and character tables of large finite groups. The author constructs all the simple satellites of the known simple groups that are not uniquely determined by a given centralizer H . Uniform existence and uniqueness proofs are given for the modern sporadic simple groups discovered by Janko, Higman and Sims, Harada and Thompson. This latter result proves a long-standing open problem in the theory. The experimental results courtesy of M. Weller for Chapter 12 are documented in the accompanying DVD.

The Classification of Finite Simple Groups Daniel Gorenstein, 2013-11-22. Never before in the history of mathematics has there been an individual theorem whose proof has required 10,000 journal pages of closely reasoned argument. Who could read such a proof, let alone communicate it to others? But the classification of all finite simple groups is such a theorem; its complete proof developed over a 30-year period by about 100 group theorists is the union of some 500 journal articles covering approximately 10,000 printed pages. How then is one who has lived through it all to convey the richness and variety of this monumental achievement? Yet such an attempt must be made for without the existence of a coherent exposition of the total proof there is a very real danger that it will gradually become lost to the living world of mathematics, buried within the dusty pages of forgotten journals. For it is almost impossible for the uninitiated to find the way

through the tangled proof without an experienced guide even the 500 papers themselves require careful selection from among some 2 000 articles on simple group theory which together include often attractive byways but which serve only to delay the journey

The Classification of the Finite Simple Groups, Number 9 Inna Capdeboscq, Daniel Gorenstein, Richard Lyons, Ronald Solomon, This book is the ninth volume in a series whose goal is to furnish a careful and largely self contained proof of the classification theorem for the finite simple groups Having completed the classification of the simple groups of odd type as well as the classification of the simple groups of generic even type modulo uniqueness theorems to appear later the current volume begins the classification of the finite simple groups of special even type The principal result of this volume is a classification of the groups of bicharacteristic type i e of both even type and of p type for a suitable The Classification of the Finite Simple Groups Daniel Gorenstein, Richard Lyons, Ronald Solomon, 1998 Normal 2-Coverings of the Finite Simple Groups and their Generalizations Daniela Bubboloni, Pablo Spiga, Thomas Stefan Weigel, 2024-07-22 This book provides a complete and comprehensive classification of normal 2 coverings of non abelian simple groups and their generalizations While offering readers a thorough understanding of these structures and of the groups admitting them it delves into the properties of weak normal coverings The focal point is the weak normal covering number of a group G the minimum number of proper subgroups required for every element of G to have a conjugate within one of these subgroups via an element of $\text{Aut } G$ This number is shown to be at least 2 for every non abelian simple group and the non abelian simple groups for which this minimum value is attained are classified The discussion then moves to almost simple groups with some insights into their weak normal covering numbers Applications span algebraic number theory combinatorics Galois theory and beyond Compiling existing material and synthesizing it into a cohesive framework the book gives a complete overview of this fundamental aspect of finite group theory It will serve as a valuable resource for researchers and graduate students working on non abelian simple groups

The Classification of Finite Simple Groups Michael Aschbacher, Richard Lyons, Stephen D. Smith, Ronald Solomon, 2011 The book provides an outline and modern overview of the classification of the finite simple groups It primarily covers the even case where the main groups arising are Lie type matrix groups over a field of characteristic 2 The book thus completes a project begun by Daniel Gorenstein's 1983 book which outlined the classification of groups of noncharacteristic 2 type However this book provides much more Chapter 0 is a modern overview of the logical structure of the entire classification Chapter 1 is a concise but complete outline of the odd case with updated references while Chapter 2 sets the stage for the remainder of the book with a similar outline of the even case The remaining six chapters describe in detail the fundamental results whose union completes the proof of the classification theorem Several important subsidiary results are also discussed In addition there is a comprehensive listing of the large number of papers referenced from the literature Appendices provide a brief but valuable modern introduction to many key ideas and techniques of the proof Some improved arguments are developed along with indications of new approaches to the entire

classification such as the second and third generation projects although there is no attempt to cover them comprehensively. The work should appeal to a broad range of mathematicians from those who just want an overview of the main ideas of the classification to those who want a reader's guide to help navigate some of the major papers and to those who may wish to improve the existing proofs.

The Classification of Finite Simple Groups Daniel Gorenstein, 2014-09-01

Finite Simple Groups Mary Stewart, 2006

Finite Simple Groups: Thirty Years of the Atlas and Beyond Manjul Bhargava, Robert Guralnick, Gerhard Hiss, Klaus Lux, Pham Huu Tiep, 2017-07-24

Classification of Finite Simple Groups one of the most monumental accomplishments of modern mathematics was announced in 1983 with the proof completed in 2004. Since then it has opened up a new and powerful strategy to approach and resolve many previously inaccessible problems in group theory, number theory, combinatorics, coding theory, algebraic geometry and other areas of mathematics. This strategy crucially utilizes various information about finite simple groups, part of which is catalogued in the Atlas of Finite Groups (John H. Conway et al) and in An Atlas of Brauer Characters (Christoph Jansen et al). It is impossible to overestimate the roles of the Atlases and the related computer algebra systems in the everyday life of researchers in many areas of contemporary mathematics. The main objective of the conference was to discuss numerous applications of the Atlases and to explore recent developments and future directions of research with focus on the interaction between computation and theory and applications to number theory and algebraic geometry. The papers in this volume are based on talks given at the conference. They present a comprehensive survey on current research in all of these fields.

The Maximal Factorizations of the Finite Simple Groups and Their Automorphism Groups Martin W. Liebeck, Cheryl E. Praeger, Jan Saxl, 1990

The main result describes completely the maximal factorizations of all the finite simple groups and their automorphism groups. As a consequence a classification of the maximal subgroups of the finite alternating and symmetric groups is obtained.

The Classification of Finite Simple Groups Daniel Gorenstein, 1983-09-30

Never before in the history of mathematics has there been an individual theorem whose proof has required 10 000 journal pages of closely reasoned argument. Who could read such a proof let alone communicate it to others? But the classification of all finite simple groups is such a theorem; its complete proof developed over a 30 year period by about 100 group theorists is the union of some 500 journal articles covering approximately 10 000 printed pages. How then is one who has lived through it all to convey the richness and variety of this monumental achievement? Yet such an attempt must be made for without the existence of a coherent exposition of the total proof there is a very real danger that it will gradually become lost to the living world of mathematics, buried within the dusty pages of forgotten journals. For it is almost impossible for the uninitiated to find the way through the tangled proof without an experienced guide; even the 500 papers themselves require careful selection from among some 2 000 articles on simple group theory which together include often attractive byways but which serve only to delay the journey.

The classification of the finite simple groups Daniel Gorenstein, Richard Lyons, Ronald Solomon, 2005

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