



#### 图书基本信息

- 书名:<<超实讲义>>
- 13位ISBN编号:9787510032981
- 10位ISBN编号:7510032989
- 出版时间:2011-4
- 出版时间:世界图书出版公司
- 作者:哥德布拉特
- 页数:289

版权说明:本站所提供下载的PDF图书仅提供预览和简介,请支持正版图书。

更多资源请访问:http://www.tushu007.com





#### 内容概要

i foundations

- 1 what are the hyperreals?
- 1.1 infinitely small and large
- 1.2 historical background
- 1.3 what is a real number?
- 1.4 historical references
- 2 large sets
- 2.1 infinitesimals as variable quantities
- 2.2 largeness
- 2.3 filters
- 2.4 examples of filters
- 2.5 facts about filters
- 2.6 zorn's lemma
- 2.7 exercises on filters
- 3 ultrapower construction of the hyperreals
- 3.1 the ring of real-valued sequences
- 3.2 equivalence modulo an ultrafilter
- 3.3 exercises on almost-everywhere
- agreement
- 3.4 a suggestive logical notation
- 3.5 exercises on statement values
- 3.6 the ultrapower
- 3.7 including the reals in the hyperreals
- 3.8 infinitesimals and unlimited numbers
- 3.9 enlarging sets
- 3.10 exercises on enlargement
- 3.11 extending functions
- 3.12 exercises on extensions
- 3.13 partial functions and hypersequences
- 3.14 enlarging relations
- 3.15 exercises on enlarged relations
- 3.16 is the hyperreal system unique?
- 4 the transfer principle
- 4.1 transforming statements
- 4.2 relational structures
- 4.3 the language of a relational structure
- 4.4 \*-transforms
- 4.5 the transfer principle
- 4.6 justifying transfer
- 4.7 extending transfer
- 5 hyperreals great and small
- 5.1 (un)limited, infinitesimal, and appreciable
- numbers
- 5.2 arithmetic of hyperreals
- 5.3 on the use of "finite" and "infinite"





- 5.4 halos, galaxies, and real comparisons
- 5.5 exercises on halos and galaxies

5.6 shadows

- 5.7 exercises on infinite closeness
- 5.8 shadows and completeness
- 5.9 exercise on dedekind completeness
- 5.10 the hypernaturals
- 5.11 exercises on hyperintegers and primes
- 5.12 on the existence of infinitely many
- primes
- ii basic analysis
- 6 convergence of sequences and series
- 6.1 convergence
- 6.2 monotone convergence
- 6.3 limits
- 6.4 boundedness and divergence
- 6.5 cauchy sequences
- 6.6 cluster points
- 6.7 exercises on limits and cluster points
- 6.8 limits superior and inferior
- 6.9 exercises on lim sup and lim inf
- 6.10 series
- 6.11 exercises on convergence of series
- 7 continuous functions
- 7.1 cauchy's account of continuity
- 7.2 continuity of the sine function
- 7.3 limits of functions
- 7.4 exercises on limits
- 7.5 the intermediate value theorem
- 7.6 the extreme value theorem
- 7.7 uniform continuity
- 7.8 exercises on uniform continuity
- 7.9 contraction mappings and fixed points
- 7.10 a first look at permanence
- 7.11 exercises on permanence of functions
- 7.12 sequences of functions
- 7.13 continuity of a uniform limit
- 7.14 continuity in the extended
- hypersequence
- 7.15 was cauchy right?
- 8 differentiation
- 8.1 the derivative
- 8.2 increments and differentials
- 8.3 rules for derivatives
- 8.4 chain rule
- 8.5 critical point theorem
- 8.6 inverse function theorem





8.7 partial derivatives 8.8 exercises on partial derivatives 8.9 taylor series 8.10 incremental approximation by taylor's formula 8.11 extending the incremental equation 8.12 exercises on increments and derivatives 9 the riemann integral 9.1 riemann sums 9.2 the integral as the shadow of riemann sums 9.3 standard properties of the integral 9.4 differentiating the area function 9.5 exercise on average function values 10 topology of the reals 10.1 interior, closure, and limit points 10.2 open and closed sets 10.3 compactness 10.4 compactness and (uniform) continuity 10.5 topologies on the hyperreals iii internal and external entities iv nonstandard frameworks v applications index





## 作者简介

作者:(新西兰)哥德布拉特(Robert Goldblatt)



### 书籍目录

i foundations 1 what are the hyperreals? 1.1 infinitely small and large 1.2 historical background 1.3 what is a real number? 1.4 historical references 2 large sets 2.1 infinitesimals as variable quantities 2.2 largeness 2.3 filters 2.4 examples of filters 2.5 facts about filters 2.6 zorn's lemma 2.7 exercises on filters 3 ultrapower construction of the hyperreals 3.1 the ring of real-valued sequences 3.2 equivalence modulo an ultrafilter 3.3 exercises on almost-everywhere agreement 3.4 a suggestive logical notation 3.5 exercises on statement values 3.6 the ultrapower 3.7 including the reals in the hyperreals 3.8 infinitesimals and unlimited numbers 3.9 enlarging sets 3.10 exercises on enlargement 3.11 extending functions 3.12 exercises on extensions 3.13 partial functions and hypersequences 3.14 enlarging relations 3.15 exercises on enlarged relations 3.16 is the hyperreal system unique? 4 the transfer principle 4.1 transforming statements 4.2 relational structures 4.3 the language of a relational structure 4.4 \*-transforms 4.5 the transfer principle 4.6 justifying transfer 4.7 extending transfer 5 hyperreals great and small 5.1 (un)limited, infinitesimal, and appreciable numbers 5.2 arithmetic of hyperreals 5.3 on the use of "finite" and "infinite" 5.4 halos, galaxies, and real comparisons 5.5 exercises on halos and galaxies 5.6 shadows 5.7 exercises on infinite closeness 5.8 shadows and completeness 5.9 exercise on dedekind completeness 5.10 the hypernaturals 5.11 exercises on hyperintegers and primes 5.12 on the existence of infinitely many primes ii basic analysis 6 convergence of sequences and series 6.1 convergence 6.2 monotone convergence 6.3 limits 6.4 boundedness and divergence 6.5 cauchy sequences 6.6 cluster points 6.7 exercises on limits and cluster points 6.8 limits superior and inferior 6.9 exercises on lim sup and lim inf 6.10 series 6.11 exercises on convergence of series 7 continuous functions 7.1 cauchy's account of continuity 7.2 continuity of the sine function 7.3 limits of functions 7.4 exercises on limits 7.5 the intermediate value theorem 7.6 the extreme value theorem 7.7 uniform continuity 7.8 exercises on uniform continuity 7.9 contraction mappings and fixed points 7.10 a first look at permanence 7.11 exercises on permanence of functions 7.12 sequences of functions 7.13 continuity of a uniform limit 7.14 continuity in the extended hypersequence 7.15 was cauchy right? 8 differentiation 8.1 the derivative 8.2 increments and differentials 8.3 rules for derivatives 8.4 chain rule 8.5 critical point theorem 8.6 inverse function theorem 8.7 partial derivatives 8.8 exercises on partial derivatives 8.9 taylor series 8.10 incremental approximation by taylor's formula 8.11 extending the incremental equation 8.12 exercises on increments and derivatives 9 the riemann integral 9.1 riemann sums 9.2 the integral as the shadow of riemann sums 9.3 standard properties of the integral 9.4 differentiating the area function 9.5 exercise on average function values 10 topology of the reals 10.1 interior, closure, and limit points 10.2 open and closed sets 10.3 compactness 10.4 compactness and (uniform) continuity 10.5 topologies on the hyperreals iii internal and external entities 11 internal and external sets 11.1 internal sets 11.2 algebra of internal sets 11.3 internal least number principle and induction 11.4 the overflow principle 11.5 internal order-completeness 11.6 external sets 11.7 defining internal sets 11.8 the underflow principle 11.9 internal sets and permanence 11.10 saturation of internal sets 11.11 saturation creates nonstandard entities 11.12 the size of an internal set 11.13 closure of the shadow of an internal set 11.14 interval topology and hyper-open sets 12 internal functions and hyperfinite sets 12.1 internal functions 12.2 exercises on properties of internal functions 12.3 hyperfinite sets 12.4 exercises on hyperfiniteness 12.5 counting a hyperfinite set 12.6 hyperfinite pigeonhole principle 12.7 integrals as hyperfinite sums iv nonstandard frameworks 13 universes and frameworks 13.1 what do we need in the mathematical world? 13.2 pairs are enough 13.3 actually, sets are enough 13.4 strong transitivity 13.5 universes 13.6 superstructures 13.7 the language of a universe 13.8 nonstandard frameworks 13.9 standard entities 13.10 internal entities 13.11 closure properties of internal sets 13.12 transformed power sets 13.13 exercises on internal sets and functions 13.14 external images are external 13.15 internal set definition principle 13.16 internal function definition principle 13.17 hyperfiniteness 13.18 exercises on hyperfinite sets and sizes 13.19 hyperfinite summation 13.20 exercises on hyperfinite sums 14 the existence of nonstandard entities 14.1 enlargements 14.2 concurrence and hyperfinite approximation 14.3 enlargements as ultrapowers 14.4 exercises on the ultrapower construction 15 permanence, comprehensiveness, saturation 15.1 permanence principles 15.2 robinson's sequential lemma 15.3 uniformly converging sequences of functions 15.4 comprehensiveness 15.5 saturation v applications 16 loeb measure 16.1



rings and algebras 16.2 measures 16.3 outer measures 16.4 lebesgue measure 16.5 loeb measures 16.6  $\mu$  -approximability 16.7 loeb measure as approximability 16.8 lebesgue measure via loeb measure 17 ramsey theory 17.1 colourings and monochromatic sets 17.2 a nonstandard approach 17.3 proving p, amsey's theorem 17.4 the finite ramsey theorem 17.5 the paris-harrington version 17.6 reference 18 completion by enlargement 18.1 completing the rationals 18.2 metric space completion 18.3 nonstandard hulls 18.4 p-adic integers 18.5 p-adic numbers 18.6 power series 18.7 hyperfinite expansions in base p 18.8 exercises 19 hyperfinite approximation 19.1 colourings and graphs 19.2 boolean algebras 19.3 atomic algebras 19.4 hyperfinite approximating algebras 19.5 exercises on generation of algebras 19.6 connecting with the stone representation 19.7 exercises on filters and lattices 19.8 hyperfinite-dimensional vector spaces 19.9 exercises on (hyper) real subspaces 19.10 the hahn-banach theorem 19.11 exercises on (hyper) linear functionals 20 books on nonstandard analysis index





# 章节摘录

版权页:插图:





### 编辑推荐

《超实讲义》是由世界图书出版公司出版的。





#### 版权说明

本站所提供下载的PDF图书仅提供预览和简介,请支持正版图书。

更多资源请访问:http://www.tushu007.com