

Table of Contents

Introduction	v
I Set Theoretic Topology	1
Dow's Questions <i>by A. Dow</i>	5
Steprāns' Problems <i>by J. Steprāns</i>	13
1. The Toronto Problem	15
2. Continuous colourings of closed graphs	16
3. Autohomeomorphisms of the Čech-Stone Compactification on the Integers	17
References	20
Tall's Problems <i>by F. D. Tall</i>	21
A. Normal Moore Space Problems	23
B. Locally Compact Normal Non-collectionwise Normal Problems	24
C. Collectionwise Hausdorff Problems	25
D. Weak Separation Problems	26
E. Screenable and Para-Lindelöf Problems	28
F. Reflection Problems	28
G. Countable Chain Condition Problems	30
H. Real Line Problems	31
References	32
Problems I wish I could solve <i>by S. Watson</i>	37
1. Introduction	39
2. Normal not Collectionwise Hausdorff Spaces	40
3. Non-metrizable Normal Moore Spaces	43
4. Locally Compact Normal Spaces	44
5. Countably Paracompact Spaces	47
6. Collectionwise Hausdorff Spaces	50
7. Para-Lindelöf Spaces	52
8. Dowker Spaces	54
9. Extending Ideals	55

10. Homeomorphisms	58
11. Absoluteness	61
12. Complementation	63
13. Other Problems	68
References	69
 Weiss' Questions	
<i>by W. Weiss</i>	77
A. Problems about Basic Spaces	79
B. Problems about Cardinal Invariants	80
C. Problems about Partitions	81
References	83
 Perfectly normal compacta, cosmic spaces, and some partition problems	
<i>by G. Gruenhage</i>	85
1. Some Strange Questions	87
2. Perfectly Normal Compacta	89
3. Cosmic Spaces and Coloring Axioms	91
References	94
 Open Problems on $\beta\omega$	
<i>by K. P. Hart and J. van Mill</i>	97
1. Introduction	99
2. Definitions and Notation	99
3. Answers to older problems	100
4. Autohomeomorphisms	103
5. Subspaces	105
6. Individual Ultrafilters	107
7. Dynamics, Algebra and Number Theory	109
8. Other	111
9. Uncountable Cardinals	118
References	120
 On first countable, countably compact spaces III: The problem of obtaining separable noncompact examples	
<i>by P. Nyikos</i>	127
1. Topological background	131
2. The $\gamma\mathbb{N}$ construction.	132
3. The Ostaszewski-van Douwen construction.	134
4. The “dominating reals” constructions.	140
5. Linearly ordered remainders	146
6. Difficulties with manifolds	152
7. In the No Man's Land	157
References	159

Set-theoretic problems in Moore spaces by G. M. Reed	163
1. Introduction	165
2. Normality	165
3. Chain Conditions	169
4. The collectionwise Hausdorff property	172
5. Embeddings and subspaces	172
6. The point-countable base problem for Moore spaces	174
7. Metrization	174
8. Recent solutions	176
References	177
Some Conjectures by M. E. Rudin	183
Small Uncountable Cardinals and Topology by J. E. Vaughan. With an Appendix by S. Shelah	195
1. Definitions and set-theoretic problems	197
2. Problems in topology	206
3. Questions raised by van Douwen in his Handbook article	209
References	212
II General Topology	219
A Survey of the Class MOBI by H. R. Bennett and J. Chaber	221
Problems on Perfect Ordered Spaces by H. R. Bennett and D. J. Lutzer	231
1. Introduction	233
2. Perfect subspaces vs. perfect superspaces	233
3. Perfect ordered spaces and σ -discrete dense sets	234
4. How to recognize perfect generalized ordered spaces	235
5. A metrization problem for compact ordered spaces	235
References	236
The Point-Countable Base Problem by P. J. Collins, G. M. Reed and A. W. Roscoe	237
1. Origins	239
2. The point-countable base problem	242
3. Postscript: a general structuring mechanism	247
References	249

Some Open Problems in Densely Homogeneous Spaces by <i>B. Fitzpatrick, Jr. and Zhou Hao-xuan</i>	251
1. Introduction	253
2. Separation Axioms	253
3. The Relationship between CDH and SLH	254
4. Open Subsets of CDH Spaces.	255
5. Local Connectedness	256
6. Cartesian Products	256
7. Completeness	257
8. Modifications of the Definitions.	257
References	257
Large Homogeneous Compact Spaces by <i>K. Kunen</i>	261
1. The Problem	263
2. Products	265
References	270
Some Problems by <i>E. Michael</i>	271
0. Introduction	273
1. Inductively perfect maps, compact-covering maps, and countable-compact-covering maps	273
2. Quotient s -maps and compact-covering maps	274
3. Continuous selections	275
References	277
Questions in Dimension Theory by <i>R. Pol</i>	279
III Continua Theory	293
Eleven Annotated Problems About Continua by <i>H. Cook, W. T. Ingram and A. Lelek</i>	295
Tree-like Curves and Three Classical Problems by <i>J. T. Rogers, Jr.</i>	303
1. The Fixed-Point Property	305
2. Hereditarily Equivalent Continua	307
3. Homogeneous Continua	308
4. Miscellaneous Interesting Questions	310
References	310

IV Topology and Algebraic Structures	311
Problems on Topological Groups and other Homogeneous Spaces	
<i>by W. W. Comfort</i>	313
0. Introduction and Notation	315
1. Embedding Problems	316
2. Proper Dense Subgroups	326
3. Miscellaneous Problems	328
References	338
Problems in Domain Theory and Topology	
<i>by J. D. Lawson and M. Mislove</i>	349
1. Locally compact spaces and spectral theory	352
2. The Scott Topology	354
3. Fixed Points	357
4. Function Spaces	358
5. Cartesian Closedness	360
6. Strongly algebraic and finitely continuous DCPO's	362
7. Dual and patch topologies	364
8. Supersober and Compact Ordered Spaces	367
9. Adjunctions	368
10. Powerdomains	369
References	370
V Topology and Computer Science	373
Problems in the Topology of Binary Digital Images	
<i>by T. Y. Kong, R. Litherland and A. Rosenfeld</i>	375
1. Background	377
2. Two-Dimensional Thinning	377
3. Three-Dimensional Thinning	381
4. Open Problems	383
Acknowledgement	384
References	384
On Relating Denotational and Operational Semantics for Programming Languages with Recursion and Concurrency	
<i>by J.-J. Ch. Meyer and E. P. de Vink</i>	387
1. Introduction	389
2. Mathematical Preliminaries	390
3. Operational Semantics	394
4. Denotational Semantics	396
5. Equivalence of O and D	398

Conclusion and Open Problems	402
References	404

VI Algebraic and Geometric Topology 407

Problems on Topological Classification of Incomplete Metric Spaces

<i>by T. Dobrowolski and J. Mogilski</i>	409
1. Introduction	411
2. Absorbing sets: A Survey of Results	411
3. General Problems about Absorbing Sets	415
4. Problems about λ -convex Absorbing Sets	416
5. Problems about σ -Compact Spaces	419
6. Problems about Absolute Borel Sets	422
7. Problems about Finite-Dimensional Spaces	424
8. Final Remarks	425
References	426

Problems about Finite-Dimensional Manifolds

<i>by R. J. Daverman</i>	431
1. Venerable Conjectures	434
2. Manifold and Generalized Manifold Structure Problems	437
3. Decomposition Problems	440
4. Embedding Questions	447
References	450

A List of Open Problems in Shape Theory

<i>by J. Dydak and J. Segal</i>	457
1. Cohomological and shape dimensions	459
2. Movability and polyhedral shape	460
3. Shape and strong shape equivalences	462
4. P -like continua and shape classifications	464
References	465

Algebraic Topology

<i>by G. E. Carlsson</i>	469
1. Introduction	471
2. Problem Session for Homotopy Theory: J. F. Adams	471
3. H -spaces	476
4. K and L -theory	478
5. Manifolds & Bordism	479
6. Transformation Groups	481
7. K. Pawałowski	484
References	485

Problems in Knot theory	
<i>by L. H. Kauffman</i>	487
0. Introduction	489
1. Reidemeister Moves, Special Moves, Concordance	489
2. Knotted Strings?	492
3. Detecting Knottedness	494
4. Knots and Four Colors	497
5. The Potts Model	499
6. States, Crystals and the Fundamental Group	501
7. Vacuum-Vacuum Expectation and Quantum Group	506
8. Spin-Networks and Abstract Tensors	509
9. Colors Again	510
10. Formations	514
11. Mirror-Mirror	517
References	518
Problems in Infinite-Dimensional Topology	
<i>by J. E. West</i>	523
1. Introduction	525
2. CE: Cell-Like Images of ANR's and Q -Manifolds	527
3. D: Dimension	532
4. SC: Shapes of Compacta	536
5. ANR: Questions About Absolute Neighborhood Retracts	542
6. QM: Topology of Q -manifolds	545
7. GA: Group Actions	552
8. HS: Spaces of Automorphisms and Mappings	561
9. LS: Linear Spaces	566
10. NLC: Non Locally Compact Manifolds	570
11. TC: Topological Characterizations	573
12. N: Infinite Dimensional Spaces in Nature	576
References	581
VII Topology Arising from Analysis	599
Problems in C_p-theory	
<i>by A. V. Arkhangel'skiĭ</i>	601
Problems in Topology Arising from Analysis	
<i>by R. D. Mauldin</i>	617
1. Topologically Equivalent Measures on the Cantor Space	619
2. Two-Point Sets	621
3. Pisot-Vijayaraghavan Numbers	622
4. Finite Shift Maximal Sequences Arising in Dynamical Systems	623

5. Borel Selectors and Matchings	623
6. Dynamical Systems on $S^1 \times \mathbb{R}$ —Invariant Continua	624
7. Borel Cross-Sections	627
References	627
VIII Dynamics	631
Continuum Theory and Topological Dynamics by <i>M. Barge and J. Kennedy</i>	633
One-dimensional versus two-dimensional dynamics by <i>S. van Strien</i>	645
1. The existence of periodic points	647
2. The boundary of ‘chaos’	648
3. Finitely many sinks	650
4. Homeomorphisms of the plane	651
5. Maps of the annulus	652
References	652
Index of general terms	655
Index of terms used in the problems	673