

Table of Contents

Preface	V
Introduction	1
<hr/>	
I. COHERENT HOMOTOPY	
<hr/>	
1. Coherent mappings	9
1.1 Mappings of inverse systems	9
1.2 Coherent mappings of inverse systems	13
1.3 Composition of coherent mappings	23
1.4 The coherence operator C	26
2. Coherent homotopy	29
2.1 The coherent homotopy category $\text{CH}(\text{pro-Top})$	29
2.2 Associativity of the composition	34
2.3 The identity morphism	41
3. Coherent homotopy of sequences	47
3.1 Coherent homotopy of finite height	47
3.2 Coherent homotopy of inverse sequences	53
4. Coherent homotopy and localization	61
4.1 An isomorphism theorem in $\text{CH}(\text{pro-Top})$	61
4.2 Cotelescopes (homotopy limits)	72
4.3 Localizing pro-Top at level homotopy equivalences	85
5. Coherent homotopy as a Kleisli category	93
5.1 The Kleisli category of a monad	93
5.2 $\text{CH}(\text{pro-Top})$ is the Kleisli category of a monad	95

II. STRONG SHAPE

6. Resolutions	103
6.1 Resolutions of spaces and mappings	103
6.2 Characterization of resolutions	107
6.3 Resolutions versus limits	112
6.4 Existence of polyhedral and ANR-resolutions	116
6.5 Resolutions of direct products and pairs	123
7. Strong expansions	129
7.1 Strong expansions of spaces	129
7.2 Resolutions are strong expansions	134
7.3 Invariance under coherent domination	138
8. Strong shape	147
8.1 Coherent expansions of spaces	147
8.2 The strong shape category	157
8.3 Strong shape equivalences	164
9. Strong shape of metric compacta	181
9.1 The Quigley strong shape category	181
9.2 Complement theorems	192
10. Selected results on strong shape	201
10.1 Normal pairs of spaces	201
10.2 Normal triads of spaces	202
10.3 Strong shape using the Vietoris system	204
10.4 The Bauer – Günther description of strong shape	205
10.5 Strong shape of compacta via multi-valued maps	208
10.6 Strong shape using approximate systems	209
10.7 Strong shape and localization	210
10.8 Stable strong shape	211

III. HIGHER DERIVED LIMITS

11. The derived functors of \lim	215
11.1 Inverse systems of modules	215
11.2 Projective and injective systems	221
11.3 \lim and its right derived functors	228
11.4 Axiomatic characterization of the functors \lim^n	240
11.5 Explicit formulae for \lim^n	244
11.6 \lim^n for sequences	249

12. \lim^n and the extension functors Ext^n	253
12.1 The bifunctors Ext^n	253
12.2 Expressing \lim^n in terms of Ext^n	262
13. The vanishing theorems	269
13.1 Homological dimension	269
13.2 Goblot's vanishing theorem	274
13.3 Systems with non-vanishing \lim^n	277
14. The cofinality theorem	285
14.1 Colimits and tensor products	285
14.2 The cofinality theorem for \lim^n	291
15. Higher limits on the category pro-Mod	301
15.1 \lim^n as a functor on pro-Mod	301
15.2 Properties of \lim^n on pro-Mod	305

IV. HOMOLOGY GROUPS

16. Homology pro-groups	319
16.1 Homology pro-groups and Čech homology	319
16.2 Higher limits of homology pro-groups	321
17. Strong homology groups of systems	327
17.1 Strong homology of pro-chain complexes	327
17.2 The first Miminoshvili sequence	336
17.3 The second Miminoshvili sequence	342
17.4 Isomorphism theorems for strong homology	348
18. Strong homology on $\text{CH}(\text{pro-Top})$	353
18.1 Chain mappings induced by coherent mappings	353
18.2 Chain mappings induced by congruence classes	359
18.3 Chain mappings induced by homotopy classes	365
18.4 Chain mappings induced by composition	368
18.5 Induced chain mappings and the coherence functor	375
19. Strong homology of spaces	379
19.1 Strong homology groups of spaces	379
19.2 Strong excision property	383
19.3 Strong homology of clusters	388
19.4 Strong homology and dimension	394
19.5 Strong homology of polyhedra	396
19.6 Strong homology of metric compacta	399

20. Spectral sequences. Abelian groups	405
20.1 The spectral sequence of a filtered complex	405
20.2 The spectral sequences of a bicomplex	413
20.3 The Roos spectral sequence	416
20.4 Pure extension functors Pext^n	422
20.5 Some theorems on abelian groups	427
21. Strong homology of compact spaces	439
21.1 Universal coefficients for compact polyhedra	439
21.2 Homology of compact spaces	443
21.3 Universal coefficients for compact spaces	446
21.4 A filtration of the strong homology group	448
21.5 Strong homology with compact supports	453
22. Generalized strong homology	459
References	465
List of Special Symbols	479
Author Index	483
Subject Index	485



<http://www.springer.com/978-3-540-66198-6>

Strong Shape and Homology

Mardesic, S.

2000, XII, 489 p., Hardcover

ISBN: 978-3-540-66198-6