

Contents

Preface	v
1 Introduction	1
1.1 Overview of the chapter	1
1.2 Frege's paradox	1
1.2.1 Classical solutions to Frege's paradox	2
1.2.2 Possible world semantics, intensional and epistemic logic	7
1.3 From possible world intensional semantics to hyperintensionality	9
1.3.1 Some solutions to hyperintensionality	12
1.4 Neo-Fregean algorithmic semantics	15
1.4.1 Tichý's notion of construction	17
1.4.2 Constructions as (linguistic) meanings	19
2 Partial type theory	23
2.1 Overview of the chapter	23
2.2 Main ideas of type theories	24
2.2.1 Simple type theory	24
2.2.2 Typed λ -calculus	25
2.2.3 Applications of type theories and typed λ -calculus	27
2.2.4 Ramified type theory	28
2.2.5 Vicious Circle Principles	30
2.3 The language of constructional pre-terms $\mathcal{L}_*$	31
2.3.1 Valuation and v -constructing	33
2.3.2 v -constructing, v -congruence, v -improper constructions	34
2.4 The main part of Tichý's type theory	34
2.4.1 Type base	34
2.4.2 The language of typed terms $\mathcal{L}_\tau$	35
2.4.3 Partial functions	35
2.4.4 Definition of TTT	36
2.5 The language $\mathcal{L}_{\text{TTT}}$	41
2.5.1 Examples of TTT entities	43
2.5.2 Explication of main set-theoretic entities	45

2.6	Semantics for $\mathcal{L}_{TTT}$	46
2.6.1	Subconstructions	49
2.6.2	Freedom of variables	50
2.6.3	Comments on v -constructing and examples	51
3	Natural deduction for partial type logic	55
3.1	Overview of the chapter	55
3.2	Matches, sequents and rules of ND_{TTT}	57
3.3	Derivation rules of ND_{TTT}	61
3.3.1	Structural Rules of ND_{TTT}	63
3.3.2	Constructional Rules of ND_{TTT}	64
3.3.3	Logical Rules of ND_{TTT}	67
3.3.4	Controlling validity of inferences	71
3.4	Substitution	73
3.4.1	Substitution and conversions in λ -calculus	73
3.4.2	Definition of the substitution function	75
3.4.3	Explicit substitution	77
3.4.4	The Rule of Substitutivity of Identicals	79
4	Transparent hyperintensional logic	81
4.1	Overview of the chapter	81
4.2	Logical analysis and semantic scheme	82
4.2.1	Some semantic principles	83
4.3	Type base of THL	85
4.3.1	Epistemic framework and THL's base	85
4.4	Extensions and intensions in THL	89
4.4.1	Intensions	89
4.4.2	Conditions	92
4.4.3	Operations on conditions	94
4.5	Constructions as meanings in THL	96
4.5.1	Analysis of singular terms, connectives, predicates	96
4.5.2	Analysis of simple sentences	97
4.5.3	Analysis of descriptions	98
4.5.4	Analysis of identity statements	99
4.5.5	Sentences without a truth value	100
4.5.6	Analysis of expressions with quantifiers	102
4.6	Comparing THL with TIL	103
5	Belief and substitution	111
5.1	Overview of the chapter	111
5.2	Attitudes and substitution	112
5.2.1	Attitudes towards common extensions	112
5.2.2	Attitudes towards intensions	113

5.2.3	Substitution and attitudes towards intensions	115
5.3	Attitudes towards constructions	117
5.4	Belief <i>de dicto/de re</i> and substitution	120
5.4.1	Belief <i>de dicto/de re</i> and PWS	120
5.4.2	Belief <i>de dicto/de re</i> and THL	122
5.4.3	Substitution in <i>de dicto/de re</i> belief contexts	123
5.4.4	Genuine/pseudo- hyperintensional context	125
5.4.5	Quantification into belief contexts	125
5.5	Puzzling substitutions in belief contexts	127
5.5.1	Belief as a multiple relation	127
5.5.2	Nested beliefs	128
5.5.3	Indirect belief reports and cross-reference	129
6	Limits of belief and knowledge	133
6.1	Overview of the chapter	133
6.2	PWS, THL and the Paradox of Omniscience	134
6.2.1	Derived beliefs	136
6.2.2	Ascribing derived beliefs	140
6.2.3	Limits of an agent's inferential resources	142
6.3	THL and EL à propositional modal logic	144
6.3.1	Modal operators	144
6.3.2	A sample derivation system governing a modal operator	146
6.4	Remarks on translating EL to THL	149
7	Belief and paradoxes	155
7.1	Overview of the chapter	155
7.2	The Bouleus Paradox and the Preface Paradox	156
7.3	Semantic paradoxes	158
7.4	Limitations explication of 'propositional' notions	165
7.5	The Paradox of Impossibility of Knowing One's Own Ignorance	169
7.6	The Knower Paradox	174
7.7	Church-Fitch's knowability paradox	177
7.7.1	The typing solution to the FP	178
7.7.2	Three inconclusive objections to the typing solution	181
7.7.3	The typing solution to the Revenge Form of the FP	182
7.7.4	Reducibility and the typing solution to the FP	184
A	The Proof of the Compensation Principle	187
	Bibliography	191
	Index of Names	217

Index of Subjects	220
Index of Main Symbols and Abbreviations	225
1.1. Introduction	1
1.2. The Problem	2
1.3. The Solution	3
1.4. The Conclusion	4
2.1. The Problem	5
2.2. The Solution	6
2.3. The Conclusion	7
3.1. The Problem	8
3.2. The Solution	9
3.3. The Conclusion	10
4.1. The Problem	11
4.2. The Solution	12
4.3. The Conclusion	13
5.1. The Problem	14
5.2. The Solution	15
5.3. The Conclusion	16
6.1. The Problem	17
6.2. The Solution	18
6.3. The Conclusion	19
7.1. The Problem	20
7.2. The Solution	21
7.3. The Conclusion	22
8.1. The Problem	23
8.2. The Solution	24
8.3. The Conclusion	25
9.1. The Problem	26
9.2. The Solution	27
9.3. The Conclusion	28
10.1. The Problem	29
10.2. The Solution	30
10.3. The Conclusion	31
11.1. The Problem	32
11.2. The Solution	33
11.3. The Conclusion	34
12.1. The Problem	35
12.2. The Solution	36
12.3. The Conclusion	37
13.1. The Problem	38
13.2. The Solution	39
13.3. The Conclusion	40
14.1. The Problem	41
14.2. The Solution	42
14.3. The Conclusion	43
15.1. The Problem	44
15.2. The Solution	45
15.3. The Conclusion	46
16.1. The Problem	47
16.2. The Solution	48
16.3. The Conclusion	49
17.1. The Problem	50
17.2. The Solution	51
17.3. The Conclusion	52
18.1. The Problem	53
18.2. The Solution	54
18.3. The Conclusion	55
19.1. The Problem	56
19.2. The Solution	57
19.3. The Conclusion	58
20.1. The Problem	59
20.2. The Solution	60
20.3. The Conclusion	61
21.1. The Problem	62
21.2. The Solution	63
21.3. The Conclusion	64
22.1. The Problem	65
22.2. The Solution	66
22.3. The Conclusion	67
23.1. The Problem	68
23.2. The Solution	69
23.3. The Conclusion	70
24.1. The Problem	71
24.2. The Solution	72
24.3. The Conclusion	73
25.1. The Problem	74
25.2. The Solution	75
25.3. The Conclusion	76
26.1. The Problem	77
26.2. The Solution	78
26.3. The Conclusion	79
27.1. The Problem	80
27.2. The Solution	81
27.3. The Conclusion	82
28.1. The Problem	83
28.2. The Solution	84
28.3. The Conclusion	85
29.1. The Problem	86
29.2. The Solution	87
29.3. The Conclusion	88
30.1. The Problem	89
30.2. The Solution	90
30.3. The Conclusion	91
31.1. The Problem	92
31.2. The Solution	93
31.3. The Conclusion	94
32.1. The Problem	95
32.2. The Solution	96
32.3. The Conclusion	97
33.1. The Problem	98
33.2. The Solution	99
33.3. The Conclusion	100
34.1. The Problem	101
34.2. The Solution	102
34.3. The Conclusion	103
35.1. The Problem	104
35.2. The Solution	105
35.3. The Conclusion	106
36.1. The Problem	107
36.2. The Solution	108
36.3. The Conclusion	109
37.1. The Problem	110
37.2. The Solution	111
37.3. The Conclusion	112
38.1. The Problem	113
38.2. The Solution	114
38.3. The Conclusion	115
39.1. The Problem	116
39.2. The Solution	117
39.3. The Conclusion	118
40.1. The Problem	119
40.2. The Solution	120
40.3. The Conclusion	121
41.1. The Problem	122
41.2. The Solution	123
41.3. The Conclusion	124
42.1. The Problem	125
42.2. The Solution	126
42.3. The Conclusion	127
43.1. The Problem	128
43.2. The Solution	129
43.3. The Conclusion	130
44.1. The Problem	131
44.2. The Solution	132
44.3. The Conclusion	133
45.1. The Problem	134
45.2. The Solution	135
45.3. The Conclusion	136
46.1. The Problem	137
46.2. The Solution	138
46.3. The Conclusion	139
47.1. The Problem	140
47.2. The Solution	141
47.3. The Conclusion	142
48.1. The Problem	143
48.2. The Solution	144
48.3. The Conclusion	145
49.1. The Problem	146
49.2. The Solution	147
49.3. The Conclusion	148
50.1. The Problem	149
50.2. The Solution	150
50.3. The Conclusion	151
51.1. The Problem	152
51.2. The Solution	153
51.3. The Conclusion	154
52.1. The Problem	155
52.2. The Solution	156
52.3. The Conclusion	157
53.1. The Problem	158
53.2. The Solution	159
53.3. The Conclusion	160
54.1. The Problem	161
54.2. The Solution	162
54.3. The Conclusion	163
55.1. The Problem	164
55.2. The Solution	165
55.3. The Conclusion	166
56.1. The Problem	167
56.2. The Solution	168
56.3. The Conclusion	169
57.1. The Problem	170
57.2. The Solution	171
57.3. The Conclusion	172
58.1. The Problem	173
58.2. The Solution	174
58.3. The Conclusion	175
59.1. The Problem	176
59.2. The Solution	177
59.3. The Conclusion	178
60.1. The Problem	179
60.2. The Solution	180
60.3. The Conclusion	181
61.1. The Problem	182
61.2. The Solution	183
61.3. The Conclusion	184
62.1. The Problem	185
62.2. The Solution	186
62.3. The Conclusion	187
63.1. The Problem	188
63.2. The Solution	189
63.3. The Conclusion	190
64.1. The Problem	191
64.2. The Solution	192
64.3. The Conclusion	193
65.1. The Problem	194
65.2. The Solution	195
65.3. The Conclusion	196
66.1. The Problem	197
66.2. The Solution	198
66.3. The Conclusion	199
67.1. The Problem	200
67.2. The Solution	201
67.3. The Conclusion	202
68.1. The Problem	203
68.2. The Solution	204
68.3. The Conclusion	205
69.1. The Problem	206
69.2. The Solution	207
69.3. The Conclusion	208
70.1. The Problem	209
70.2. The Solution	210
70.3. The Conclusion	211
71.1. The Problem	212
71.2. The Solution	213
71.3. The Conclusion	214
72.1. The Problem	215
72.2. The Solution	216
72.3. The Conclusion	217
73.1. The Problem	218
73.2. The Solution	219
73.3. The Conclusion	220
74.1. The Problem	221
74.2. The Solution	222
74.3. The Conclusion	223
75.1. The Problem	224
75.2. The Solution	225
75.3. The Conclusion	226
76.1. The Problem	227
76.2. The Solution	228
76.3. The Conclusion	229
77.1. The Problem	230
77.2. The Solution	231
77.3. The Conclusion	232
78.1. The Problem	233
78.2. The Solution	234
78.3. The Conclusion	235
79.1. The Problem	236
79.2. The Solution	237
79.3. The Conclusion	238
80.1. The Problem	239
80.2. The Solution	240
80.3. The Conclusion	241
81.1. The Problem	242
81.2. The Solution	243
81.3. The Conclusion	244
82.1. The Problem	245
82.2. The Solution	246
82.3. The Conclusion	247
83.1. The Problem	248
83.2. The Solution	249
83.3. The Conclusion	250
84.1. The Problem	251
84.2. The Solution	252
84.3. The Conclusion	253
85.1. The Problem	254
85.2. The Solution	255
85.3. The Conclusion	256
86.1. The Problem	257
86.2. The Solution	258
86.3. The Conclusion	259
87.1. The Problem	260
87.2. The Solution	261
87.3. The Conclusion	262
88.1. The Problem	263
88.2. The Solution	264
88.3. The Conclusion	265
89.1. The Problem	266
89.2. The Solution	267
89.3. The Conclusion	268
90.1. The Problem	269
90.2. The Solution	270
90.3. The Conclusion	271
91.1. The Problem	272
91.2. The Solution	273
91.3. The Conclusion	274
92.1. The Problem	275
92.2. The Solution	276
92.3. The Conclusion	277
93.1. The Problem	278
93.2. The Solution	279
93.3. The Conclusion	280
94.1. The Problem	281
94.2. The Solution	282
94.3. The Conclusion	283
95.1. The Problem	284
95.2. The Solution	285
95.3. The Conclusion	286
96.1. The Problem	287
96.2. The Solution	288
96.3. The Conclusion	289
97.1. The Problem	290
97.2. The Solution	291
97.3. The Conclusion	292
98.1. The Problem	293
98.2. The Solution	294
98.3. The Conclusion	295
99.1. The Problem	296
99.2. The Solution	297
99.3. The Conclusion	298
100.1. The Problem	299
100.2. The Solution	300
100.3. The Conclusion	301
101.1. The Problem	302
101.2. The Solution	303
101.3. The Conclusion	304
102.1. The Problem	305
102.2. The Solution	306
102.3. The Conclusion	307
103.1. The Problem	308
103.2. The Solution	309
103.3. The Conclusion	310
104.1. The Problem	311
104.2. The Solution	312
104.3. The Conclusion	313
105.1. The Problem	314
105.2. The Solution	315
105.3. The Conclusion	316
106.1. The Problem	317
106.2. The Solution	318
106.3. The Conclusion	319
107.1. The Problem	320
107.2. The Solution	321
107.3. The Conclusion	322
108.1. The Problem	323
108.2. The Solution	324
108.3. The Conclusion	325
109.1. The Problem	326
109.2. The Solution	327
109.3. The Conclusion	328
110.1. The Problem	329
110.2. The Solution	330
110.3. The Conclusion	331
111.1. The Problem	332
111.2. The Solution	333
111.3. The Conclusion	334
112.1. The Problem	335
112.2. The Solution	336
112.3. The Conclusion	337
113.1. The Problem	338
113.2. The Solution	339
113.3. The Conclusion	340
114.1. The Problem	341
114.2. The Solution	342
114.3. The Conclusion	343
115.1. The Problem	344
115.2. The Solution	345
115.3. The Conclusion	346
116.1. The Problem	347
116.2. The Solution	348
116.3. The Conclusion	349
117.1. The Problem	350
117.2. The Solution	351
117.3. The Conclusion	352
118.1. The Problem	353
118.2. The Solution	354
118.3. The Conclusion	355
119.1. The Problem	356
119.2. The Solution	357
119.3. The Conclusion	358
120.1. The Problem	359
120.2. The Solution	360
120.3. The Conclusion	361
121.1. The Problem	362
121.2. The Solution	363
121.3. The Conclusion	364
122.1. The Problem	365
122.2. The Solution	366
122.3. The Conclusion	367
123.1. The Problem	368
123.2. The Solution	369
123.3. The Conclusion	370
124.1. The Problem	371
124.2. The Solution	372
124.3. The Conclusion	373
125.1. The Problem	374
125.2. The Solution	375
125.3. The Conclusion	376
126.1. The Problem	377
126.2. The Solution	378
126.3. The Conclusion	379
127.1. The Problem	380
127.2. The Solution	381
127.3. The Conclusion	382
128.1. The Problem	383
128.2. The Solution	384
128.3. The Conclusion	385
129.1. The Problem	386
129.2. The Solution	387
129.3. The Conclusion	388
130.1. The Problem	389
130.2. The Solution	390
130.3. The Conclusion	391
131.1. The Problem	392
131.2. The Solution	393
131.3. The Conclusion	394
132.1. The Problem	395
132.2. The Solution	396
132.3. The Conclusion	397
133.1. The Problem	398
133.2. The Solution	399
133.3. The Conclusion	400
134.1. The Problem	401
134.2. The Solution	402
134.3. The Conclusion	403
135.1. The Problem	404
135.2. The Solution	405
135.3. The Conclusion	406
136.1. The Problem	407
136.2. The Solution	408
136.3. The Conclusion	409
137.1. The Problem	410
137.2. The Solution	411
137.3. The Conclusion	412
138.1. The Problem	413
138.2. The Solution	414
138.3. The Conclusion	415
139.1. The Problem	416
139.2. The Solution	417
139.3. The Conclusion	418
140.1. The Problem	419
140.2. The Solution	420
140.3. The Conclusion	421
141.1. The Problem	422
141.2. The Solution	423
141.3. The Conclusion	424
142.1. The Problem	425
142.2. The Solution	426
142.3. The Conclusion	427
143.1. The Problem	428
143.2. The Solution	429
143.3. The Conclusion	430
144.1. The Problem	431
144.2. The Solution	432
144.3. The Conclusion	433
145.1. The Problem	434
145.2. The Solution	435
145.3. The Conclusion	436
146.1. The Problem	437
146.2. The Solution	438
146.3. The Conclusion	439
147.1. The Problem	440
147.2. The Solution	441
147.3. The Conclusion	442
148.1. The Problem	443
148.2. The Solution	444
148.3. The Conclusion	445
149.1. The Problem	446
149.2. The Solution	447
149.3. The Conclusion	448
150.1. The Problem	449
150.2. The Solution	450
150.3. The Conclusion	451
151.1. The Problem	452
151.2. The Solution	453
151.3. The Conclusion	454
152.1. The Problem	455
152.2. The Solution	456
152.3. The Conclusion	457
153.1. The Problem	458
153.2. The Solution	459
153.3. The Conclusion	460
154.1. The Problem	461
154.2. The Solution	462
154.3. The Conclusion	463
155.1. The Problem	464
155.2. The Solution	465
155.3. The Conclusion	466
156.1. The Problem	467
156.2. The Solution	468
156.3. The Conclusion	469
157.1. The Problem	470
157.2. The Solution	471
157.3. The Conclusion	472
158.1. The Problem	473
158.2. The Solution	474
158.3. The Conclusion	475
159.1. The Problem	476
159.2. The Solution	477
159.3. The Conclusion	478
160.1. The Problem	479
160.2. The Solution	480
160.3. The Conclusion	481
161.1. The Problem	482
161.2. The Solution	483
161.3. The Conclusion	484
162.1. The Problem	485
162.2. The Solution	486
162.3. The Conclusion	487
163.1. The Problem	488
163.2. The Solution	489
163.3. The Conclusion	490
164.1. The Problem	491
164.2. The Solution	492
164.3. The Conclusion	493
165.1. The Problem	494
165.2. The Solution	495
165.3. The Conclusion	496
166.1. The Problem	497
166.2. The Solution	498
166.3. The Conclusion	499
167.1. The Problem	500
167.2. The Solution	501
167.3. The Conclusion	502
168.1. The Problem	503
168.2. The Solution	504
168.3. The Conclusion	505
169.1. The Problem	506
169.2. The Solution	507
169.3. The Conclusion	508
170.	