

CONTENTS

I.	The principle of compositionality of meaning	1
	1. An attractive principle	2
	2. Frege and the principle	5
	2.1. Introduction	5
	2.2. Grundlagen	6
	2.3. Sinn und Bedeutung	8
	2.4. The principle	9
	2.5. Conclusion	11
	3. Towards a formalization	11
	4. An algebraic framework	17
	5. Meanings	28
	5.1. Introduction	28
	5.2. Natural language	29
	5.3. Programming Language	29
	5.4. Predicate Logic	30
	5.5. Strategy	34
	5.6. Substitutional Interpretation	34
	6. Motivation	35
II.	The algebraic framework	41
	1. Introduction	42
	2. Algebras and subalgebras	43
	3. Algebras for syntax	50
	4. Polynomials	56
	5. Term algebras	61
	6. Homomorphisms	67
	7. A safe deriviver	75
	8. Montague grammar	81
	9. Discussion	90
III.	Intensional logic	95
	1. Two facets	96
	1.1. Introduction	96
	1.2. Model-part I	96
	1.3. Model-part II	98
	1.4. Laws	98
	1.5. Method	99
	2. Two-sorted type theory	100
	3. The interpretation of Ty2	103
	4. Properties of Ty2	106
	5. Intensional Logic	113
	6. Properties of IL	117
	7. Extension and intension	123

IV	Montague grammar and programming languages	127
	1. Assignment statements	128
	1.1. Introduction	128
	1.2. Simple assignments	129
	1.3. Other assignments	131
	2. Semantics of programs	133
	2.1. Why?	133
	2.2. How?	135
	3. Predicate transformers	137
	3.1. Floyd's forward predicate transformer	137
	3.2. Hoare's backward predicate transformer	139
	3.3. Problems with Floyd's rule	139
	3.4. Predicate transformers as meanings	141
	4. Semantical Considerations	144
	4.1. The model	144
	4.2. The logic	148
	4.3. Theorems	150
	5. First fragment	152
	5.1. The rules	152
	5.2. Examples	154
	6. Pointers and arrays	156
	6.1. Pointers	156
	6.2. Arrays	158
	7. Second fragment	161
	7.1. The rules	161
	7.2. The postulates	164
	7.3. A model	166
	8. Correctness and completeness	168
	8.1. State transition semantics	168
	8.2. Strongest postconditions	169
	8.3. Completeness	172
	9. The backward approach	176
	9.1. Problems with Hoare's rule	176
	9.2. Backward predicate transformers	177
	9.3. Weakest preconditions	178
	9.4. Strongest and weakest	179
	9.5. Correctness proof	182
	10. Mutual relevance	185
Appendix	Safe and polynomial	189
Index of names		193
References		197