

Peter Graf

Term Indexing

Technische Hochschule Darmstadt
FACHBEREICH INFORMATIK

B I B L I O T H E K

Inventar-Nr.: M.96-00.196.....

Sachgebiete: I - 2.....

Standort: 1996.....



Springer

Contents

1	Introduction	1
1.1	Fundamentals of Term Indexing	4
1.2	Original Contributions of this Book	12
1.3	Reader's Guide	14
2	Preliminaries	17
2.1	Rules	17
2.2	First-Order Logic	18
2.3	Graphs and Trees	24
2.4	Algorithms	25
3	Fundamental Data Structures and Algorithms	27
3.1	Memory Management	28
3.2	Terms	29
3.3	Substitutions, Matching, and Unification	35
4	Attribute-Based Indexing	43
4.1	Matching Prefest	44
4.2	Outline Indexing	45
4.3	Superimposed Codewords	47
5	Set-Based Indexing	51
5.1	Top Symbol Hashing	52
5.2	Coordinate Indexing	53
5.3	Path Indexing	56
5.3.1	Standard Path Indexing	58
5.3.2	Dynamic Path Indexing	87
5.3.3	Extended Path Indexing	90
5.3.4	Path Indexing for Subterm Retrieval	113
5.3.5	Path Indexing for AC-Theories	115

6	Tree-Based Indexing	127
6.1	Discrimination Tree Indexing	127
6.1.1	Standard Discrimination Trees	128
6.1.2	Perfect Discrimination Trees	138
6.1.3	Deterministic Discrimination Trees	142
6.1.4	Adaptive Discrimination Trees	146
6.2	Abstraction Tree Indexing	150
6.2.1	Standard Abstraction Trees	150
6.2.2	Linear Abstraction Trees	157
6.3	Substitution Tree Indexing	158
6.3.1	Standard Substitution Trees	160
6.3.2	Weighted Substitution Trees	189
6.3.3	Linear Substitution Trees	191
6.3.4	Compiled Substitution Trees	193
7	Comparison of Indexing Techniques	201
7.1	Data Structures	202
7.2	Soundness and Completeness	204
7.3	Functionality	205
7.4	Complexity	210
7.5	Performance	212
8	Indexing in Theorem Provers	233
8.1	Binary Resolution	234
8.2	Binary Resolution with Theory Unification	234
8.3	Hyperresolution	235
8.4	Unit Resulting Resolution	236
8.4.1	PURR	237
8.5	Subsumption	248
8.6	Paramodulation	256
8.7	Demodulation	257
8.8	Completion	259
9	Summary	265
9.1	A Short Survey on the Presented Indexing Techniques	266
9.2	Main Results	268
9.3	Conclusions	270
9.4	The Future	272
	Bibliography	275
	Index	281