Appendix

In this appendix, we provide the reader with interesting and relevant information about CHR research. It serves as a starting point for potential future researchers. We first provide a carefully selected list of the most influential papers on CHR, before we offer complete lists of books, surveys, and theses related to CHR. Finally, we provide a list of CHR researchers, ordered by country.
Appendix

A.1 Most Influential Papers, So Far

In 2011 it is 20 years that the Constraint Handling Rules (CHR) language was designed. This anniversary provides a good reason to find out which are the best, i.e. most influential, papers published on CHR so far. The following papers have been selected using a online survey and citation frequencies. The papers include basic theory, analysis, compilation but also a number of highly successful applications of CHR. Most of these papers are available online, the CHR website with its extensive bibliography is a good starting point. Of course, such lists are always incomplete and they are only a snapshot of a vivid research field.

Bibliography


A.2 Literature available on CHR

In this section, we provide pointers to relevant literature on Constraint Handling Rules for the interested reader. The following sections individually present books, applications, surveys, and theses. A bibliography of about 300 selected papers can be found at the CHR website. New research papers on CHR are regularly published at the following conferences, workshops, and journals:

- Intl. Conf. Logic Programming
- Intl. Symp. Logic-Based Program Synthesis and Transformation
- Workshop on Constraint Handling Rules
- Workshop on Logic Programming
- Workshop on Functional and Logic Programming
- Theory and Practice of Logic Programming

Books


The first book that presents constraint logic programming languages and constraint solving systems in a uniform and concise way, using CHR as a specification and implementation language.


A selection of recent research papers on CHR.


The standard reference authored by the designer of CHR - Provides a CHR tutorial for easy introduction - An essential source for researchers, lecturers, graduate students and professional programmers.

Surveys


Theses


A.3 CHR Researchers by Country

The following is a list of CHR researchers by country:

**Germany** Hariolf Betz, Thom Frühwirth, Mark Meister, Frank Raiser, Martin Sulzmann, Jairson Vitorino, Armin Wolf

**Belgium** Bart Demoen, Leslie De Koninck, Paolo Pilozzi, Jon Sneyers, Tom Schrijvers, Peter Van Weert

**Australia** María García de la Banda, Gregory J. Duck, Peter J. Stuckey

**Italy** Marco Alberti, Maurizio Gabbielli, Marco Gavanelli, Evelina Lamma, Jacopo Mauro, Paola Mello, Maria Chiara Meo, Paolo Tacchella, Paolo Torroni

**France** François Fages, Thierry Martinez, Eric Monfroy

**Spain** Rémy Haemmerlé

**Singapore** Edmund S.L. Lam

**Brazil** Jacques Robin

**Egypt** Slim Abdennadher

**Denmark** Henning Christiansen

**Canada** Verónica Dahl

**Austria** Christian Holzbaur

**USA** Beata Sarna-Starosta
Index

234-tree, 78

Abduction, 37
Abstract Domain, 290
Abstract Interpretation, 283
Framework, 289
Abstraction Function, 290
Acceptable Encoding, 267
Active Constraint, 23, 285
Answer, 267
Applications of CHR, 35
Arrays, 184
Association Lists, 184

Bisimilarity, 210
Body, see Rule
Built-in Constraints, 16

CHR Machine, 168
Complexity, 172
CHR Syntax, 16
CHR-Only Machine, 169
CHRG, 37
Church-Turing Thesis, 164
Commutative Monoid, 259
Compilation, 54, 133
CHR\textsuperscript{op} 104
Guard, 64
Completion, 26
Complexity, 26, 165, 202
Amortized, 167
Asymptotic, 166
CHR Machines, 172
Constant Factors, 187
RAM Machines, 165
Turing Machines, 165
Computational Linguistics, 37
Computational Power, 26
Concrete Function, 290
Concurrency, 122, 123
Confluence, 25, 101
Constraint Propagators, 93
Constraint Solvers, 35
Continuation Optimization, 75

Delay Avoidance, 79
Dependency Rank, 178
Description Logic, 36
Deterministic, 22
Dijkstra’s Algorithm, 92, 190
Equivalence Relation, 245, 254
Example Programs, 29
Execution Stack, 57
Extensions of CHR, 34
Adaptive CHR, 34
Aggregates, 34
Disjunction, 34
Negation as Absence, 34, 182
Search, 34
Solver Hierarchies, 35
Functional Dependencies, 177
Functional Programming, 27, 184

Galois Connection, 290
Global Variables, 242, 254
Goal, 242
Ground Constraint, 75
Groundness Analysis, 299
Guard, see Rule, 64, 67

Halting Problem, 160
Hash
Bucket, 78
Collision, 78
Function, 78
Table, 77
Head, see Rule
Host Language, 16, 169

Implied Rule Instance, 207
Indexing, 177
Join Ordering, 73, 177
Join-Calculus, 39

K.U.Leuven CHR system, 71

Late Indexing, 111
Late Storage, 74, 293
Lazy Matching, 134
Leuven CHR System, 29
Lexicographic Order, 35
Linear Constraints, 253
Linear Store, 254
Logic Programming, 27, 184
Logical Algorithms, 198, 199
Logical Semantics, 19

Match Tree, 135
Memory Reuse, 178
Merge Operator, 258
Meta-Complexity, 176, 179
CHR\(^{\text{sp}}\), 225
Logical Algorithms, 201
Minsky machine, 163
Mode Declaration, 30
Modularity, 26, 35
Monotonicity, 123, 259
Multi-Agent Systems, 36

Natural Language Processing, 37
Never Stored, 74
Non-Linear Constraints, 35
Normal Form, 207
Normalisation
Guard, 55
Head, 55
Program, 56

Observation, 293
Occurrence, 17, 57, 60, 109, 218
Number, 17
Passive, 112

Operational Semantics
Abstract, 20
Concurrency, 123
Denotational, 284
Derivation, 21
Equivalence-based, 250
Informal, 17
Logical Algorithms, 200
Persistent, 255
Priority-based, 91, 98, 105
Theoretical, 20

Optimization, 109, 111
OWL, 36

Partial Order, 261
Persistent Constraints, 253
Persistent Store, 254
Pre-normal Form, 206
Priority Queue, 225
Program Analysis, 25
Program Generation, 36
Program Point, 285
Propagation History, 21, 59

RAM Machine, 162
Peano-Arithmetic, 162
Standard, 163
Range-Restricted, 264
Rational Trees, 35
Refined Semantics, 22
Register Initialization, 182
RETE, 116, 218
Rule
Body, 17
Guard, 17
Head, 17
Name, 17
Propagation, 16
Simpagation, 16
Simplification, 16
Syntax, 16
Rule Engines, 185
Rule Priorities
Dynamic, 97
Static, 98
Rules
CHR\(^{\text{sp}}\), 98, 216
Pathological, 267
Runtime Library, 73

Scheduling, 36, 223
Semantic Function, 289
Abstract, 291
Semantic Web, 36
Soft Constraints, 35, 94
Solver Generation, 36
Space Complexity, 166
Spatio-Temporal Reasoning, 36
State Transition System
\(\omega_d\), 286
\(\omega_p\), 98
\( \omega_r, 23 \)
\( \omega_{rp}, 105 \)
\( \omega_l, 255 \)
\( \omega_e, 250, 252 \)
\( \omega_{set}, 24, 277 \)
\( \omega_r, 177 \)
\( \omega_l, 20, 21 \)

Goal-Based, 126, 127

States

\( \omega_p\)-State, 98
\( \omega_r\)-State, 23
\( \omega_l\)-State, 254
\( \omega_e\)-State, 242

Abstract State, 290
Execution State, 21
Execution state, 285
Failure, 21
Final, 21, 130
Initial, 21, 130
Joinable, 25

Substitution, 245, 254
Sudoku, 32
Suspension

Cache, 179

Syntax, 16

Term Rewriting, 185
Termination, 25, 129, 132, 265
Testing, 38

Time Complexity, 165

Turing Machine, 160

Non-Deterministic, 161

Turing-Complete, 164, 169

Type Declaration, 30

Type Systems, 37

Variable Renaming, 246

Verification, 38