

Decision Procedures

Calogero G. Zarba

LAST UPDATE: TUESDAY, MARCH 7, 2006

Copyright © 2006 Calogero G. Zarba

Contents

| | | |
|----------|--|-----------|
| 1 | Many-Sorted Logic | 1 |
| 1.1 | Syntax | 1 |
| 1.2 | Semantics | 5 |
| 1.3 | Modelclasses | 7 |
| 2 | Equality | 9 |
| 2.1 | The modelclass | 9 |
| 2.2 | Congruence closure | 9 |
| 2.3 | Nelson-Oppen | 12 |
| 3 | Reals | 17 |
| 3.1 | The modelclass | 17 |
| 3.2 | Gaussian elimination | 18 |
| 3.3 | Fourier-Motzkin | 20 |
| 4 | Integers | 23 |
| 4.1 | The modelclass | 23 |
| 4.2 | Cooper | 24 |
| 5 | Lists | 29 |
| 5.1 | Constructors | 29 |
| 5.2 | Lists | 30 |
| 5.3 | From constructors to equality with acyclicity test | 30 |
| 5.4 | From lists to constructors | 32 |
| 6 | Arrays | 33 |
| 6.1 | The modelclass | 33 |
| 6.2 | Equality reduction | 33 |
| 7 | Sets | 37 |
| 7.1 | The modelclass | 37 |
| 7.2 | Equality reduction | 38 |

| | |
|-----------------------------------|-----------|
| 8 Multisets | 41 |
| 8.1 The modelclass | 41 |
| 8.2 Integer reduction | 42 |
| 9 Combination | 45 |
| 9.1 Combination Theorem | 45 |
| 9.2 Nelson-Oppen | 47 |