

# Contents

	<b>Acknowledgments</b> .....	<b>xi</b>
<b>1</b>	<b>Introduction</b> .....	<b>1</b>
<b>2</b>	<b>Preference Modeling and Reasoning</b> .....	<b>3</b>
2.1	Constraint reasoning .....	4
2.1.1	Constraints .....	4
2.1.2	Constraint solvers .....	5
2.2	Soft constraints .....	9
2.2.1	Specific soft constraint formalisms .....	10
2.2.2	General soft constraint formalisms .....	12
2.2.3	Computational properties of soft constraints .....	14
2.2.4	Bipolar preferences .....	14
2.3	CP-nets .....	16
2.3.1	Conditional preferences .....	16
2.3.2	Preference ordering .....	17
2.3.3	Computational properties .....	18
2.4	Soft constraints vs. CP-nets .....	19
2.4.1	Expressiveness comparison .....	19
2.4.2	Approximating CP-nets via soft constraints .....	20
2.4.3	CP-nets and hard constraints .....	20
2.5	Temporal preferences .....	20
2.6	Abstracting, explaining, and eliciting preferences .....	22
2.6.1	Abstraction techniques .....	22
2.6.2	Explanation generation .....	23
2.6.3	Learning and preference elicitation .....	24
2.7	Other preference modeling frameworks .....	25
2.8	Conclusions .....	27
<b>3</b>	<b>Uncertainty in Preference Reasoning</b> .....	<b>29</b>
3.1	Interval-based preferences .....	29
3.2	Missing preferences .....	33

3.2.1	Interleaving complete search and elicitation	36
3.2.2	Interleaving local search and elicitation	37
3.3	Conclusions	38
<b>4</b>	<b>Aggregating Preferences</b>	<b>41</b>
4.1	Voting	41
4.1.1	Voting rules	42
4.1.2	Properties of voting rules	45
4.1.3	Fairness and manipulation	46
4.1.4	Single-peaked preferences	47
4.2	Computational aspects of manipulation and control	47
4.2.1	Manipulation algorithms	49
4.2.2	Tie-breaking	51
4.2.3	Control	51
4.2.4	Hybrid rules	52
4.2.5	Manipulation on average	53
4.2.6	Manipulation in practice	53
4.2.7	Parameterized complexity	54
4.3	Mechanism design	55
4.4	Incomparability	55
4.5	Uncertainty in preference aggregation	56
4.5.1	Incomplete profiles	56
4.5.2	Unknown agenda	57
4.6	Preference compilation	57
4.7	Combinatorial domains	58
4.8	Conclusions	60
<b>5</b>	<b>Stable Marriage Problems</b>	<b>61</b>
5.1	Stability	62
5.2	Ties and incompleteness	64
5.3	Manipulation	65
5.4	Extensions	66
5.5	Compact preference representation	67
5.6	Constraint-based formalizations	68
5.7	Conclusions	69

<b>Bibliography</b> .....	<b>71</b>
<b>Authors' Biographies</b> .....	<b>89</b>