

Susumu Cato

# Rationality and Operators

The Formal Structure of Preferences

 Springer

# Contents

<b>1</b>	<b>Introduction</b> . . . . .	1
1.1	The Aim of This Book . . . . .	1
1.2	Rationality of Preference . . . . .	3
1.3	An Operational Interpretation of Theorems of Welfare Economics . . . . .	5
1.4	What Can the Operational Approach Achieve? . . . . .	6
1.5	A Historical Perspective . . . . .	7
1.6	The Structure of This Book . . . . .	8
	References . . . . .	9
<b>2</b>	<b>Preferences and Operators</b> . . . . .	11
2.1	Introduction . . . . .	11
2.2	Binary Relations . . . . .	12
2.3	Basic Results on Operators . . . . .	13
2.4	Closure Operators . . . . .	21
2.5	Concluding Remarks . . . . .	33
	References . . . . .	34
<b>3</b>	<b>Rationality and Operators</b> . . . . .	35
3.1	Introduction . . . . .	35
3.2	Properties of Binary Relations . . . . .	36
3.3	Choice Functions . . . . .	52
3.4	Extensions . . . . .	56
3.5	Concluding Remarks . . . . .	65
	References . . . . .	67
<b>4</b>	<b>Operations Over the Set of Binary Relations</b> . . . . .	69
4.1	Introduction . . . . .	69
4.2	Basic Results . . . . .	70
4.3	Direct Operations Over the Set of Binary Relations . . . . .	76

4.4 Indirect Operations Over the Set of Binary Relations . . . . . 84

4.5 Concluding Remarks . . . . . 87

References . . . . . 88

**5 Application to Welfare Economics . . . . . 89**

5.1 Introduction . . . . . 89

5.2 Setting . . . . . 90

5.3 Paretian Welfare Economics . . . . . 91

5.4 The Kaldor–Hicks Compensation Principle . . . . . 96

5.5 Bergsonian–Samuelson Approach of Welfare Economics . . . . . 102

5.6 Concluding Remarks . . . . . 108

References . . . . . 108

**6 Conclusion: Beyond Ordinal Operators . . . . . 111**

6.1 More Applications . . . . . 111

6.2 Operators for Ordinal Preferences . . . . . 113

6.3 Operators for Cardinal Preferences . . . . . 115

6.4 Final Remarks . . . . . 117

References . . . . . 118

**Index . . . . . 121**