

Krassimir T. Atanassov

# Intuitionistic Fuzzy Logics

 Springer

# Contents

<b>1</b>	<b>Elements of Intuitionistic Fuzzy Propositional Calculus</b> . . . . .	1
1.1	Intuitionistic Fuzzification of the Validity of Propositions . . . . .	1
1.2	Intuitionistic Fuzzy Implications . . . . .	9
1.3	Discussion on Intuitionistic Fuzzy Implications . . . . .	10
1.4	Intuitionistic Fuzzy Negations . . . . .	18
1.5	Properties of Intuitionistic Fuzzy Implications and Negations . . . . .	19
1.6	De Morgan Laws and Law for Excluded Middle . . . . .	52
1.7	New Intuitionistic Fuzzy Conjunctions and Disjunctions . . . . .	56
	References . . . . .	60
<b>2</b>	<b>Intuitionistic Fuzzy Predicate Logic</b> . . . . .	65
2.1	Short Remarks on Intuitionistic Fuzzy Predicate Logic . . . . .	65
2.2	Extended Intuitionistic Fuzzy Quantifiers . . . . .	71
2.3	Ideas for New Types of Quantifiers . . . . .	75
	References . . . . .	76
<b>3</b>	<b>Intuitionistic Fuzzy Modal Logics</b> . . . . .	79
3.1	Intuitionistic Fuzzy Classical Modal Operators . . . . .	79
3.2	Extensions of the Intuitionistic Fuzzy Modal Operators . . . . .	93
3.3	Second Type of Intuitionistic Fuzzy Modal Operators . . . . .	106
3.4	Intuitionistic Fuzzy Level Operators . . . . .	120
3.5	Pseudo-fixed Points of the Intuitionistic Fuzzy Operators and Quantifiers . . . . .	122
	References . . . . .	123
<b>4</b>	<b>Temporal and Multidimensional Intuitionistic Fuzzy Logics</b> . . . . .	125
4.1	Temporal Intuitionistic Fuzzy Logic . . . . .	125
4.2	Multidimensional Intuitionistic Fuzzy Logics . . . . .	129
	References . . . . .	133
<b>5</b>	<b>Conclusion</b> . . . . .	135
	<b>Index</b> . . . . .	137