studyguide

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1 Chapter 1

1.1 Propositional Logic

1.1.1 Converse Contrapositive and Inverse (p -> q)

- Coverse
  - q → p
- Contrapositive
  - -q → -p
- Inverse
  - -p → -q

1.2 Applications of Propositional Logic

1.2.1 Examples of turning sentences into propositional Logic.

1.3 Propositional Equivalences

1.3.1 Logical Equivalences

p∧T	p	Identity Laws
p∨F	p	
p∨T	T	Domination Laws
p∧F	F	
p∨p	p	Idempotent Laws
p∧p	p	
-(-p)	p	Double Negation Laws
p∨q	q∨p	Commutative Laws
p∧q	q ∧p	
(p∨q) ∨ r	p∨(q ∨ r)	Associative Laws
(p∧q) ∧ r	p ∧(q ∧ r)	
p∨(q ∧ r)	(p∨q) ∧ (p ∨ r)	Distributive Laws
p ∧(q ∨ r)	(p∧q) ∨ (p ∧ r)	
-(p∧q)	-p∨ − q	De Morgans Laws
-(p v q)	-p∧ − q	
p∨(p ∧ q)	p	Absorption Laws
p ∧(p ∨ q)	p	
p v -p	T	Negation Laws
p∧ − p	F	

1.3.2 Logical Equivelances Involving Conditional Statements

$p \to q$	$\neg p \vee q$
$p \to q$	$\neg q \to \neg p$
$p \vee q$	$\neg p \to q$
$p \wedge q$	$\neg(p \to \neg q)$
$\neg(p \to q)$	$p \wedge q$
$(p \to q) \wedge (p \to r)$	$p \to (q \wedge r)$
$(p \to r) \wedge (q \to r)$	$(p \vee q) \to r$
$(p \to q) \vee (p \to r)$	$p \to (q \vee r)$
$(p \to r) \vee (q \to r)$	$(p \wedge q) \to r$

1.3.3 Logical Equivalences Involving Biconditional Statements

$p \leftrightarrow q$	$(p \to q) \wedge (q \to p)$
$p \leftrightarrow q$	$\neg p \leftrightarrow \neg q$
$p \leftrightarrow q$	$(p \wedge q) \vee (\neg p \wedge \neg q)$
$\neg(p \leftrightarrow q)$	$p \leftrightarrow \neg q$

1.4 Predicates and Quantifiers

1.4.1 Quantifiers

- Universal Quantifer
  - (x) DX
  - «

1.5 Nested Quantifers
1.6 Rules of Inference
1.7 Introduction to Proofs
1.8 Proof methods and Strategy
2 Chapter 2
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