An Introduction Propositional Calculus (PC)

Symbols of PC

p, q, r … stand for propositions.

Propositions may be true or false or contingent – sometimes true sometimes false.

~p is the negation of p

$\wedge$ means AND, a conjunction

$\vee$ means OR, a disjunction

$\uparrow$ means NAND, not AND

at least one is false

$\downarrow$ means NOR, not OR

if both then it's false

Underline of any symbol means exclusive use – see Truth Tables

$\rightarrow$ condition if ... then

$\Rightarrow$ bi-conditional if and only if

Theorems

Joining Rule

If p and q are theorems (well formed) then < p $\wedge$ q > is a theorem.

Separation Rule

If < p $\wedge$ q> is a theorem (well formed) then both p and q are theorems.

Double Tilde Rule

~ ~ can be inserted or removed from any well-formed theorem.

Deduction

If q can be derived when p is assumed the < p $\rightarrow$ q > is a theorem (a fantasy)

Detachment Rule

the modus ponens

If p and < p $\rightarrow$ q > are both theorems then q is a theorem

Carry Over Rule

Inside a fantasy any theorem from the reality one level higher can be used

Switcheroo Rule

< ~p $\vee$ q > $\equiv$ < p $\rightarrow$ q >

Contrapositive Rule

< ~q $\rightarrow$ ~p > $\equiv$ < p $\rightarrow$ q >

De Morgan's Rule

~ < p $\vee$ q > $\equiv$ < ~p $\wedge$ ~q >

When multiplying out the bracket with the tilde sign the conjunction or disjunction flips.

rg

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