

10/25/2011

Informal Summary Section 1.5

This section proof's are based on tautologies. They are called **Indirect Proof's** they are replace the statement to be proved by the an equivalent statement or statements.

Proof by Contraposition (or contra positive proof) P implies Q

Step 1. Assume $\sim Q$

.

Therefore, $\sim P$

Thus, $\sim Q$ implies $\sim P$

Therefore, P implies Q

This method works well then there can be a connection made between the denials of P and Q is easier to understand than the connection between P and Q themselves or the statement of either P and Q is a negation itself.

Proof by Contradiction. The logic of this proof is that if the statement cannot be false then it must be true. Therefore, to prove this we must first assume that P is false to prove that it is in fact true.

Proof by Contradiction of P:

Suppose $\sim P$

Therefore Q

Therefore $\sim Q$

Hence, Q and $\sim Q$, a contradiction

Thus, P.

This method is good because it can be applied to any proposition P, whereas, the direct proof's and contra position proof's have to be applied specifically to conditional sentences. This method is also useful because Q is not given specifically. Therefore, we have to prove P using any proposition which can make solving this type of proof very insightful.

Proof's of Biconditional sentences (P iff Q).

- This is a two part proof with the following general form

Two Part Proof P iff Q

(I) Show P implies Q

(II) Show Q implies P

Therefore, P iff Q.

For this type of proof you may use different methods to solve each part.

Alternative Proof of Biconditional Sentences P iff Q:

- This form uses the iff throughout the whole proof. With the help of introducing n intermediate R statements.

Biconditional Proof of P iff Q:

P iff R1

Iff R2

Iff Rn

Iff Q.

Important Definitions:

Consistent axiom systems: statements that cannot be negated or proved as written.

Undeciable: When a statement cannot be proved or disproved.

Example: Euclid's fifth postulate on the basis for plane geometry.