

Lecture 3. Propositional logic, Propositional Variables and Compound Propositions(命题逻辑、命题变量和复合命题)

Propositional logic

area of logic that studies ways of joining and/or modifying propositions to form more complicated propositions and it also studies the logical relationships and properties derived from these combined/altered propositions (逻辑领域，研究连接和/或修改命题以形成更复杂命题的方法，并且还研究从这些组合/更改的命题导出的逻辑关系和属性)

What does this definition really mean?

Statement 1 - "Adam is good in playing football"

Statement 2 - "Adam is good in playing football and this time he is representing his college at National level."

"Adam is good in playing football (and) this time he is representing his college at National level."

↑ proposition 1 joining two propositions with logical connective ↑ proposition 2

Statement 3 - "I enjoy watching Television."

Statement 4 - "It is not the case that I enjoy watching Television."

↑
Modifying the statement using negation

Fact: propositional logic is sometimes called as "sentential logic" or "statement logic"

Why do we need compound propositions?

Because most of the mathematical statements are constructed by combining one or more than one propositions.

Propositional Variables

"Adam is good in playing football and this time he is representing his college at National level."

OR

if p = Adam is good in playing football
 q = this time he is representing his college at National level.

$p \wedge q$ ← p and q

Definition: Variables that are used to represent propositions are called Propositions Variable.