

# Logical Proof of The Millennium Puzzle PNP

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## Abstract

The existence of the premise:  $S=1$ , Then there is at least one P Problem(Computer-table problems) equal to NP problem (The solution is a computer-verifiable problem) then:  $P \longleftrightarrow NP(P=NP)$ .

**Keywords:** Logic true value table , Boolean algebra (BA in computer) , Higher order Logic , Turing machine

**Class P:** For all the problems that can be solved by a computer.

**Class NP:** That is, all the solutions can verify that the solution is correct.

**Deduce :** Inference and prediction of special events are derived from assumptions and universal principles , When using logical rules to analyse , Deductive inference relies on a set of initial assumptions i. e (generally acknowledged truth) , If the original hypothesis is true, there is no logical contradiction in the same analysis , In accordance with the logical rules , then The conclusion must be true: Problems that a computer can handle include : image processing , speech input , numerical calculation , The intersection of the three is a binary system: 0 , 1.

For 0 , 1, there are [0 , 0] [0 , 1] [1 , 0] [1 , 1] four types. In Boolean algebraic system  $0+1=1$  ,

Then, it is knowable that  $1-1=0$  it is impossible that a logical expression is the same thing at the same time.

Discuss a special question here , Computer weather forecast is obviously a P-like problem. The weather forecast is clear if it is rainy or sunny.

## Define as Below:

The weather forecast is rainy equal [1]. And the weather forecast is sunny equal [0]. From the practical experience , Computer weather forecast is a P-like problem , And the actual verification of the weather forecast is a NP-like problem.

- Forecast rain , The actual weather is also raining , Then the computer weather forecast is accurate.
- Forecast rain , The actual weather is sunny , Then the computer weather forecast is not accurate.
- Forecast sunny , The actual weather was also fine, Then the computer weather forecast is accurate.
- Forecast sunny , The actual weather is raining, Then the computer weather forecast is not accurate.
- If weather forecast is accurate, Weather forecast results will add one point (S+1) , if weather forecast is not accurate,

Weather forecast results will subtract one point (S-1).

6. Logic is  $S+1(\text{True})$  ,  $S-1(\text{Fail})$ .....S is assignment.

The logical truth table can be obtained as below :

1	1	S+1
1	0	S-1
0	0	S+1
0	1	S-1

Table A: By Boolean algebra , to get  $S+1=1+1=1$ .  
 $S-1=1-1=0$ .

1	1	1
1	0	0
0	0	1
0	1	0

Table B: There is a left shift by the Turing machine reader to indicate :S-1 , Move a grid right to indicate :S+1 , Group of logical truth tables that form the p, np logic framework , It can be summed up as the logical truth table of the weather forecast (the basic starting point of this paper) , above formulation, It is logically valid.

Turing machine reading head to the left : S-1, Move a grid to the right :S+1.

P	NP	
F	F	S+1
F	L	S-1
L	L	S+1
L	F	S-1

Table C:

P	NP	
1	1	1
1	0	0
0	0	1
0	1	0

Table D : Be drawn from the logical table truth table : In the s assignment of 1,  $P=NP$ , Record :  $P \leftarrow \rightarrow NP$ .

For all classes P and all classes NP. By the circuit switch has on and off two states , There is  $2^n$  ,

Constructing polynomials :

Exist  $S=1+2+2^2+2^3+2^4+\dots+2^n$ .

$H2S=2+2^2+2^3+2^4+\dots+2^{(n+1)}$ .

There is  $S=2S-S$ .

Then  $S=2^{(n+1)}-1$  Because of higher order logic :  $2^{(n+1)}=1$ . And :  $S=2^{(n+1)}-1$ .

$S=1-1$ .

$S=0$ .

P	NP	
F	F	0+1
F	L	0-1
L	L	0+1
L	F	0-1

A logical value table can be drawn: That is, there is no expression for  $p = np$  , Serve as :  $P \neq NP$ .

For a single  $S=1$  Or  $S=0$ . Build a new logical table and a logical formula .

$S_2=0$  Indicates that the read header remains the current state , Overwrites the current state to another state logical expression of :  $S_2+1$  (  $S_2=0$ ).

P	NP	
F	F	1
F	L	0
L	L	1
L	F	0

P	NP	
F	F	$S_2+1$
F	L	$S_2$
L	L	$S_2+1$
L	F	$S_2$

P	NP	
F	F	1
F	L	1
L	F	1
L	L	1

$S=0$  In Boolean algebra :  $S+1=1$ .

$S_2=0$   $S_2+1=1$ .

To get In a single time  $S_2=0$ , also have  $P=NP$  , the same  $P \square \square NP$ .

In  $S=1$  condition,  $S+1=1$ ,  $S=1$ .

$S_2=1$  then  $S_2+1=1$   $S_2=1$ .

$S_2=1$  then  $P \neq NP$ .

Summarize the above logical table , It can be concluded that except from the Turing shutdown problem.

Have a class P problem equal to a class NP problem , There are also class P problems not equal to class NP problems

Conclusion: For all the class P and class NP problems , There are  $P=NP$  , also have  $P \neq NP$ .  $P \& NP$ [Edit]  
[1, 2].

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