

## 論文摘要

本篇論文主要在討論兩個人參選時的開票情況，研究「 $n + m$ 人投票且無人投廢票的情況下，其中一人至少得  $n$  票且一路領先的開票方法數等於此人得  $n$  票的所有開票方法數」，第一章介紹研究動機及他人所使用的方式，使用路徑的方法證明一人得  $n$  票，另一人得  $m$  票， $n \geq m$ ，得  $n$  票的人一路領先且勝出的方法數等於  $C_n^{m+n} - C_{n+1}^{m+n} = C_m^{m+n} - C_{m-1}^{m+n}$ ，再用計算相消的方式算出，此人至少得  $n$  票且一路領先的開票方法數等於此人得  $n$  票的所有開票方法數。

第二章介紹用一個折路徑的方法，將所有「一人得  $n$  票開票方法數」中非一路領先的路徑圖，經由一個壓扁、翻轉的摺紙方式，對應到「此人至少得  $n$  票且一路領先」的開票情況路徑圖，經由數學論證，這樣的路徑，是一對一且映成，並舉出兩個例子驗證其結果。

論文最後，提出一個猜想：若參選人數為三人時，其中一位參選人一路領先且勝出的開票方法數，應該可以用立體空間的方塊圖之路徑來證明。本篇論文，雖然沒有繼續討論這個有趣的問題，但也留下一個新的研究方向。

關鍵詞：好路徑、一路領先

## Brief of the thesis

The theme of this thesis is mainly to discuss of situation of counting and announcing the ballots in an election with two candidates. In explaining the contents of the "Total  $n+m$  votes, there's no invalid vote. One candidate wins at least  $n$  votes and lead all the way. Under this circumstance this number of the way will be equal to all numbers of the way for these  $n$  votes of this candidate." At first, we will introduce the methodology of the other adopt, the methodology of previous path of way proves one candidate known to have  $n$  votes, another candidate has  $m$  votes, the method of candidate with  $n$  votes who leads all the way and won will be equal to  $C_n^{m+n} - C_{n+1}^{m+n} = C_m^{m+n} - C_{m-1}^{m+n}$ , and then result of calculating cancellation will prove this candidate will have at last  $n$  votes and leads the way to victory will be equal to all the methodologies of counting and announcing the ballots in this election.

A method of flip the path will be introduced in the second chapter.

Corresponding to the road map of ballot counting for the candidate who has  $n$  votes and lead the way to victory, the road map of same one with  $n$  votes without leading the way through a step-ping, flip the way of origami will be mathematically proves such reflect of the way will be reflect one to one and onto. By means of the discrete method is able to prove this result and the method to verify availability

Finally, I would like to propose a surmise: If the number of candidates increased to 3, the methodology of the one who leads all the way should be able to use three-dimensional space of a block diagram of the path to prove. Although this thesis does not to continue pondering the interesting question, but also left a new research direction.

Key words: a good path, leading all the way