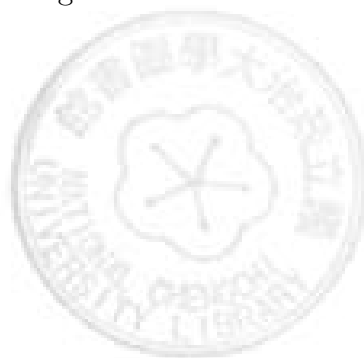


## Abstract

In this thesis, we find the lower bounds of number of vertices and edges of uniform mixed hypergraph which is uniquely colorable. We show that the size of vertex set of uniform mixed hypergraphs with unique coloring is more than  $(l - 1)(m - 1) + 1$  and we come up a way to construct uniquely colorable uniform mixed hypergraphs. If a mixed hypergraph is an  $r$ -uniform hypergraph with  $\mathcal{D}$  empty, then it is uniquely colorable when  $r = 2$ . Otherwise, an  $r$ -uniform hypergraph with  $\mathcal{D}$  empty is not uniquely colorable. We will introduce two systematic ways to construct a uniform mixed hypergraph which is uniquely colorable and achieves our bounds. First, we reduce the number of  $\mathcal{C}$ -edges such that uniform mixed hypergraphs keep being uniquely colorable. Then we reduce the number of  $\mathcal{D}$ -edges. We consider  $r$ -uniform  $\mathcal{C}$ -hypergraphs and  $\mathcal{D}$ -hypergraphs and find the bounds on their number of edges.



## 中文摘要

在本篇論文，我們去找一個唯一著色的均勻混合超級圖的點數及邊數的下界。我們證明為一著色的均勻混合超級圖的點數必須超過  $(l - 1)(m - 1) + 1$  而且我們提出一個方法來建構為一著色的均勻混合超級圖。如果一個混合超圖是個  $\mathcal{D}$  為空集合的  $r$ -均勻超級圖，當  $r = 2$  則它是唯一著色的。否則， $\mathcal{D}$  為空集合的均勻超級圖不會是唯一著色的。我們介紹兩種有系統的方法建構唯一著色的均勻混合超級圖並且達到我們的邊界。首先，我們是著保持均勻混合超級圖的唯一著色下去減少  $\mathcal{D}$  邊的個數。然後我們減少  $\mathcal{D}$  邊的個數。我們考慮  $r$  均勻的  $\mathcal{C}$  超圖和  $\mathcal{D}$  超圖並找他們邊的個數的範圍。

