

# 國立中山大學應用數學系

## 學術演講

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講題一：Coloring of generalized signed graphs (I)、  
(II)、(III)、(IV)

時間：2019/1/18 (星期五) 14:10 ~ 15:00, 15:10 ~ 16:00  
2019/1/25 (星期五) 14:10 ~ 15:00, 15:10 ~ 16:00

講題二：List coloring of graphs (I)、(II)、(III)、(IV)

時間：2019/2/1 (星期五) 14:10 ~ 15:00, 15:10 ~ 16:00  
2019/2/15 (星期五) 14:10 ~ 15:00, 15:10 ~ 16:00

地點：理學院四樓理 SC 4013 室

茶會：16:00 於理 SC 4010 室 (系辦公室)

### 摘要

A *signed graph* is a pair  $(G, \sigma)$ , where  $G$  is a graph and  $\sigma : E(G) \rightarrow \{1, -1\}$  is an *signature* of  $G$  which assigns to each edge  $e$  of  $G$  a sign  $\sigma_e \in \{1, -1\}$ . Colouring of signed graphs was first studied by Zaslavsky in the 1980's, and has attracted some recent attention. There are a few definitions of  $k$ -colouring of signed graphs that are not equivalent.

One is given by Macajova, Raspaud and Skoviera. For a positive integer  $k$ , if  $k = 2q$  is even, then let  $M_k = \{\pm 1, \pm 2, \dots, \pm q\}$ ; if  $k = 2q + 1$  is odd, then let  $M_k = \{0, \pm 1, \pm 2, \dots, \pm q\}$ . A *MRSZ- $k$ -colouring*  $\phi$  of  $G$  is a mapping  $\phi : V(G) \rightarrow M_k$  such that for each edge  $e = uv$ ,  $\phi(u) \neq \sigma_e \phi(v)$ .

Another definition is given by Kang and Steffen. A *KS- $k$ -colouring*  $\phi$  of  $G$  is a mapping  $\phi : V(G) \rightarrow Z_k$  such that for each edge  $e = uv$ ,  $\phi(u) \neq \sigma_e \phi(v)$ .

It was conjectured by Macajova, Raspaud and Skoviera that every signed planar graph is MRSZ-4-colourable; and it was conjectured by Kang and Steffen that every signed planar graph is KS-4-colourable.

In this series of talks, I shall explore generalized signed graph colouring that are common generalization of these two colourings and many other colouring concepts.

It turns out that colouring of generalized signed graphs are closely related to some list colouring problems. We shall also explore such relations.

Some new and classical problems concerning list colouring of graphs are also explored and the concept of strong fractional choice number, and defective online list colourings and polynomial method will be explored.

This series of talks contains joint work with Ligang Jin and Tsai-Lien Wong, Tingting Jiang, Seog-Jin Kim, Ringi Kim, Daphne Liu and Yeong-Nan Yeh

中山大學應用數學系

敬 請 公 告！ 歡 迎 參 加！

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