國立中山大學應用數學系
學術演講

講　者：劉德芬 教授
　　　　Department of Mathematics, California State University Los Angeles, USA

講　題：Coloring of Generalized Signed Triangle-Free Planar Graphs

時　間：2019/2/19（星期二）16:10～17:00

地　點：理學院四樓理 SC 4013 室

茶　會：15:30 於理 SC 4010 室（系辦公室）

摘 要

Let G be a graph. We view G as a symmetric digraph D. That is, each edge xy in D is replaced by two opposite arcs $e = (x, y)$ and $e^{-1} = (y, x)$. Denote S an inverse closed subset of permutations of positive integers. An S-signature of D is a mapping σ which assigns to each arc of D an element in S, where

$$\sigma(e^{-1}) = (\sigma(e))^{-1}.$$

We say G is S-k-colorable if for every S-signature σ on any D, there exists a mapping $f : V(G) \to [k] = \{1, 2, 3, \ldots, k\}$ such that for each arc $e = (x, y)$, $\sigma_e(f(x)) \neq f(y)$.

The concept of S-k-colorable is a common generalization of several graph coloring or graph choosability problems, such as DP-coloring and coloring of signed graphs, etc. In this talk, we introduce some relations among these concepts.

Next, we focus on triangle-free planar graphs (abbreviated as TFP graphs). A set S is called TFP-good if every TFP graph is S-3-colorable. It is know by Grötzsch's theorem that every TFP graph is 3-choosable. This is equivalent to say that every TFP graph is $\{id\}$-3-choosable. That is, $\{id\}$ is TFP-good.

We investigate other sets S that are TFP-good. In particular, we prove that for any inverse closed subset S of S_3 which is not isomorphic to $\{id, (12)\}$, S is TFP-good if and only if either $S = \{id\}$ or there exists $a \in [3]$ such that for each $\pi \in S$, $\pi(a) \neq a$. It remains an open question whether or not $S = \{id, (12)\}$ is TFP-good.

This is a joint work with **Yiting Jiang** (Zhejiang Normal University), **Yeong-Nan Yeh** (Academia Sinica, Taiwan), and **Xuding Zhu** (Zhejiang Normal University).

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