中央研究院數學研究所
Institute of Mathematics, Academia Sinica

2023 One Day Workshop on Graph Theory & Combinatorics
２０２３圖論與組合數學研討會
Auditorium, 6F, Astro-Math. Building (NTU campus)
天 文 數 學 館 六 樓 演 講 廳 (台 大 校 區)

Thursday, July 20
7 月 20 日(四)

Talk 1　10:00 – 10:50　Professor Shishuo Fu (Chongqing University)
Partitions with parts separated by parity: conjugation, congruences and the mock theta functions

In two papers recently published in Ann. Comb., Andrews continued his study of integer partitions with parts separated by parity, a concept that first arose in a study related to the third-order mock theta function $v(q)$. Noting a curious link between Andrews's even-odd crank and the Stanley rank, we adopt a combinatorial approach building on the map of conjugation. We will discuss results that grow out of this combinatorial perspective, which include a parametrized identity that generalizes Andrews's bivariate generating function, two families of Andrews-Beck type congruences, and new connections with mock theta functions. The talk is based on joint work with Dazhao Tang.

Talk 2　11:00 – 11:50　Professor Jiuyu Fan (Sichuan University)
Multiplication Rules of CSM Classes

Chern-Schwartz-MacPherson (CSM) classes of Schubert cells can be viewed as a generalization of the Schubert classes in classical flag varieties. We introuduce Pieri type as well as Murnaghan-Nakayama type formulas for equivariant CSM classes of Schubert cells. These formulas include many previously known multiplication formulas for CSM classes or Schubert classes as special cases. This talk is based on joint work with Peter Guo and Rui Xiong.

Lunch　11:50 – 14:00

Talk 3　14:00 – 14:50　Professor Shu-Chung Liu (National Tsing Hua University)
A renewal approach to prove the Four Color Theorem unplugged
I. RGB-tilings and degree 5 vertices in a diamond

We introduce R/G/B-tilings as well as their tri-coexisting version RGB-tiling on an MPG or a semi-MPG. We associate these four kinds of edge-colorings with 4-colorings by 1/2/3/4 on vertices in MPS's or semi-MPG's. Several basic properties for tilings on MPG's and semi-MPG's are developed. Especially the idea of R/G/B-canal lines, as well as canal system, is a cornerstone. In this talk, we introduce two tools based on RGB-tilings. They normal and generalized canal lines or rings and Σ-adjustments. Using these tools, we show a major result: No four vertices of degree 5 form a diamond in any extremum EP.

Talk 4　15:00 – 15:50　Professor Shu-Chung Liu (National Tsing Hua University)
II. Type A and Type B e-diamonds

We use R/G/B Kempe chains to enhance our coloring skill. We explore several necessary conditions, as well as sufficient conditions, for $EP - \{e\}$ by using Type A or Type B e-diamond and Kempe chains.

Organizers: Chun-Ju Lai (Academia Sinica) & Yeong-Nan Yeh (Academia Sinica)

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