國立中山大學應用數學系
學術演講

講　者：Jing Huang (University of Victoria)

講　題：(k, l)-Colourings of Graphs

時　間：2023/2/20（Monday）2:10 pm ∼ 3:00 pm

地　點：理學院四樓理 SC 4013 室

茶　會：1:45 pm 於理 SC 4010 室（系辦公室）

Abstract

For a pair of natural numbers k, l, a (k, l)-colouring of a graph G is a partition of the vertex set of G into (possibly empty) sets $\{S_1, \ldots, S_k\}$, $\{C_1, \ldots, C_l\}$ such that each set S_i is an independent set and each set C_j induces a clique in G. The (k, l)-colouring problem, which is NP-complete in general, has been studied for the special graphs such as chordal graphs, cographs and line graphs.

Let $\hat{\kappa}(G) = (\kappa_0(G), \kappa_1(G), \ldots, \kappa_{\theta(G)-1}(G))$ and $\hat{\lambda}(G) = (\lambda_0(G), \lambda_1(G), \ldots, \lambda_{\chi(G)-1}(G))$ where $\kappa_l(G)$ (respectively, $\lambda_k(G)$) is the minimum k (respectively, l) such that G has a (k, l)-colouring. We prove that $\hat{\kappa}(G)$ and $\hat{\lambda}(G)$ are a pair of conjugate sequences for every graph and when G is a cograph, the number of vertices in G is equal to the sum of the numbers in $\hat{\kappa}(G)$ or in $\hat{\lambda}(G)$. Using the decomposition property of cographs we show that every cograph can be represented by Ferrers diagram. We device algorithms for computing $\hat{\kappa}(G)$ and for finding an induced subgraph in G which can be used to certify the non-(k, l)-colourability of a cograph.

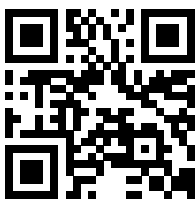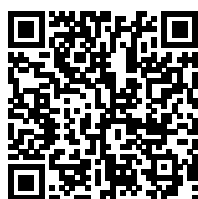This is joint work with Dennis Epple.

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