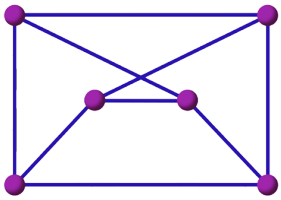

SEMINARIUM
MATEMATYKA DYSKRETNA

czwartek, 6 kwietnia 2017 r., godz. 12:00, s. 304 A3-A4

SECURE COMMUNICATION NETWORKS AND GRAPH COLOURING

Ingo Schiermeyer
TU Freiberg, Germany

Secure communication in networks can be formulated as a graph edge colouring problem, where edges correspond to channels and colours to passwords. For a secure communication between two agencies we require that consecutive channels (edges) receive distinct passwords (colours), i.e. any two consecutive edges obtain distinct colours (are properly coloured).

An edge-coloured graph G is called *properly connected* if any two vertices are connected by a path whose edges are properly coloured. The *proper connection number* of a connected graph G, denoted by $\mathrm{pc}(G)$, is the smallest number of colours that are needed in order to make G properly connected. Our main result is the following: Let G be a connected graph of order n and $k \geqslant 2$. If $|E(G)| \geqslant \binom{n-k-1}{2} + k + 2$, then $\mathrm{pc}(G) \leqslant k$ except when $k = 2$ and $G \in \{G_1, G_2\}$, where $G_1 = K_1 \vee (2K_1 + K_2)$ and $G_2 = K_1 \vee (K_1 + 2K_2)$.