



SEMINARIUM MATEMATYKA DYSKRETNA

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3-colourability, diamonds and spindle graphs

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(joint work with Christoph Brause and Přemysl Holub)

The 3-colourability problem is an NP-complete problem which remains NP-complete for claw-free graphs and for graphs with maximum degree four. In this talk we will consider induced subgraphs, among them are the *claw* ($K_{1,3}$), the *bull* (a triangle with two pendent edges), the *net* (a triangle with three pendent edges), and the *diamond* (the graph $K_4 - e$).

Our main result is a complete characterization of all 3-colourable (claw, H) -free graphs for $H \in \{\text{bull}, \text{net}, P_7\}$. We will present a description of all non 3-colourable (claw, H) -free graphs for $H \in \{\text{bull}, \text{net}, P_7\}$ in terms of diamonds. Moreover, we will show extensions of this characterization to larger graph classes by taking supergraphs of the claw or the bull.

- [1] B. Randerath and I. Schiermeyer, *Vertex colouring and forbidden subgraphs - a survey*, **Graphs and Combinatorics** 20 (2004) 1-40.
- [2] I. Schiermeyer and B. Randerath, *Polynomial χ -Binding Functions and Forbidden Induced Subgraphs: A Survey*, **Graphs and Combinatorics** 35 (1) (2019) 1-31.