

NMAG403 - Combinatorics

November 1, 2024 – Chromatic number and Chooseability

Homework

Deadline: **November 27, 2024**

Send to: honza@kam.mff.cuni.cz (in PDF)

1. Prove that a tree has a perfect matching if and only if deleting any vertex creates exactly one component with an odd number of vertices.
2. Prove that the chooseability of any planar triangle-free graph is at most 4.
3. Let G be a bipartite graph with n vertices. Prove that $ch(G) \leq \lceil \log_2(n) \rceil + 1$.

In class problems

26. Prove that every orientation of a bipartite graph has a kernel.
27. Prove that for every k , there is a triangle-free graph with $\chi(G) > k$.
28. Prove that for every k , there is a bipartite graph G with $ch(G) > k$.
29. Prove that the chooseability of any planar bipartite graph is at most 3.