

NMAG403 - Combinatorics

October 20, 2023 – Matching

In class problems

14. Prove Hall's theorem (the difficult implication) from Tutte's theorem .
15. How many different perfect matchings does the Petersen graph have?
16. How many different perfect matchings does the complete graph K_n have? How many of them contain a given fixed edge?
17. How many different spanning trees does the complete graph K_n have? How many of them contain a given fixed edge?
18. Prove that every maximal matching in a graph G has at least $\frac{\mu(G)}{2}$ edges.
19. Construct a 3-regular graph with no perfect matching.
20. For every k , construct a graph of minimum degree at least k with exactly one perfect matching.
21. Prove that if a graph G contains no perfect matching, then it has a vertex v such that each edge incident with v belongs to a maximum matching of G .