

Problem set 5

This problem set is due in class on Thursday April 19th, 2007.

1. Deduce König's theorem about the maximum size of a matching in a bipartite graph from the min-max relation for the maximum independent set common to two matroids.
2. Consider problem 6 from problem set 4. Using the min-max relation for matroid intersection, show that a necessary and sufficient condition for being able to orient a graph $G = (V, E)$ such that the indegree of any vertex v is at most $k(v)$ is that, for all $S \subseteq V$,

$$|E(S)| \leq \sum_{v \in S} k(v),$$

where $E(S)$ denotes the set of edges with both endpoints in S .