최적화근사해법
제 9주 과제

홍 성 필

서울대학교 산업공학과
최적화 연구실

A supplementary lecture note for the book *Approximation algorithms* by V. Vazirani

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HW

17.1 Give an alternative proof of Lemma 17.7 by using Hall's Theorem. (This theorem states that a bipartite graph $G = (U, V, E)$has a matching that matches all vertices of U iff for every set $U' \subseteq U$, the neighborhood of U' is at least as large as U'. The neighborhood of U' is $\{v \in V \mid \exists u \in U' \text{ with } (u, v) \in E\}$.)

17.2 Prove that the solution given to LP(m) in Example 17.9 is an extreme point solution.

17.4 Prove the following strengthening of Lemma 17.6. There is an extreme point solution to LP(T) such that its corresponding bipartite graph, G, is a forest.

(17.5) (Hochbaum and Shmoys [136]) Give a PTAS for the problem of minimizing makespan on uniform parallel machines. In this problem there is a speed s_i associated with each machine i, and the processing time for job j on machine i is p_j/s_i.