Syllabus for cs260, Approximation Algorithms, Winter 2006

topics

background *reading: chapter 1, Johnson's 1973 paper, sections 1 and 2 of KY*

2-approx for unweighted vertex cover via max'l matching *reading: chapter 1*

2-approx for steiner tree via MST *reading: chapter 3*

Christofides 1.5-approx for metric TSP *reading: chapter 3*

PTAS for knapsack by coarsening *reading: chapter 8; section 6 of KY*

ln(n)-approx for set cover by greedy *reading: chapters 2, 13, [14, 15]*

linear programming *reading: section 12.3, 14.1 (see 13.1 for def'n of set cover LP)*

duality, 2-approx for weighted vertex cover via duality *reading: chapter 12 of book; section 7 of KY*

basic probability, randomized rounding *reading: section 14.2 of book, section 4 of KY*

max-cut, max-sat by randomized rounding

Chernoff bound, load-balancing (from chapter) *reading: section 4 of KY*

semi-definite programming, max-cut by semidefinite programming *reading: chapter 26*

multicommodity flow by lagrangian relaxation?

hardness of approximation *reading: chapter 29*

10 ? presentations (1-2 per class)

references

Book: Approximation Algorithms by Vijay Vazirani

Chapter: CRC handbook chapter by Klein and Young
(available via http://www.cs.ucr.edu/∼neal)

Paper: Approximation Algorithms for Combinatorial Problems, by David Johnson, JCSS 1974 (available via search at http://scholar.google.com)