Friday 14th October, 2016 12:15

Test 2 topics

The second test will focus on the material listed below, but the material from the first test may appear. You should know to solve the problems on homework assignments 4, 5 and 6 and quiz 3. I will pass out the solutions to homework 6 and quiz 3 on Monday.

(1) Weak Duality - If $\mathbf{x}$ is feasible for P and π is feasible for its dual D, then $\pi^T \mathbf{b} \leq \mathbf{c}^T \mathbf{x}$ (and proof).
(2) Finding the dual of a linear program in general form (Definition 3.1)
(3) Strong Duality (Theorem 3.1)
(4) Dual of the dual is primal (Theorem 3.2)
(5) Chart with possible combinations of finite optimum, unbounded and infeasible for the primal and the dual (Theorem 3.3 in PS)
(6) Complementary slackness (section 3.4) (and proof)
(7) Farkas Lemma (Theorem 3.5) (and proof)
(8) Feasible basis and dual feasible basis - B is a dual feasible basis if $\pi^T = \mathbf{c}_B^T \mathbf{A}_B^{-1}$ is feasible for the dual
(9) Dual simplex method (Section 3.6)
(10) Handling additional constraints, changes to the objective function or changes to the vector $\mathbf{b}$.
(11) Shadow/marginal prices - (see the dual simplex presentation for a discussion of this topic - HW 6 #1 is also relevant).
(12) zero-sum games, pure strategy, mixed strategy Alice, Bob, $\beta(\mathbf{x})$, $\alpha(\mathbf{y})$, worst-case optimal strategy, value of game, linear program corresponding to a matrix game
(13) Minimax theorem
(14) incidence matrix of a graph
(15) maximum matching as an ILP and minimum vertex cover as an ILP (see pages 146 and 147 in section 8.2 of GM)