Quiz 6

2/2 questions correct

Excellent!

Retake

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1.

Consider the following LP and its dual.

Primal :

$\min 10x_1 + 5x_2 + 4x_3$

s.t.

(Constraint 1) $x_1 + x_2 + x_3 \geq 10$

(Constraint 2) $x_1 - 1x_3 \geq 2$

(Constraint 3) $-5x_1 + x_2 - 2x_3 \geq 4$

(Constraint 4) $6x_1 - 1x_2 + x_3 \geq 8$

(Constraint 5,6,7) $x_1, x_2, x_3 \geq 0$

Dual :

$\max 10y_1 + 2y_2 + 4y_3 + 8y_4$

s.t.

(Constraint 1) $y_1 + y_2 - 5y_3 + 6y_4 \leq 10$

(Constraint 2) $y_1 + y_3 - y_4 \leq 5$

(Constraint 3) $y_1 - y_2 - 2y_3 + y_4 \leq 4$

(Constraint 4,5,6,7) $y_1, y_2, y_3, y_4 \geq 0$

Which of the following pairs of solutions are optimal for both the primal and the dual.

- [ ] $x_1 = 14, x_2 = 70, x_3 = 0$ and $y_1 = 1, y_2 = 1, y_3 = 12, y_4 = 11$

Well done!

- [ ] $x_1 = 13, x_2 = 65, x_3 = 23$ and $y_1 = 1, y_2 = 1, y_3 = 42, y_4 = 39$

Well done!

- [ ] $x_1 = 12, x_2 = 64, x_3 = 0$ and $y_1 = 0, y_2 = 0, y_3 = 40, y_4 = 35$

Well done!

- [ ] $x_1 = 14, x_2 = 74, x_3 = 4$ and $y_1 = 0, y_2 = 0, y_3 = 0, y_4 = 0$

Well done!

✔ 2.

Consider a linear program PRIMAL and its dual DUAL:

PRIMAL:

$\max c \cdot x$

$Ax \leq b, x \geq 0.$

DUAL:

$\min b \cdot x$

$A^T y \geq c, y \geq 0.$

Suppose x is an optimal solution for PRIMAL and y an optimal solution for DUAL.

Select all the correct statements.

- [ ] For any constraint i, if $x_i = 0$ then $c_i = \sum_j a_{ij} y_j$.

Well done!

- [ ] For any constraint i, if $x_i = 0$ then $c_i \neq \sum_j a_{ij} y_j$.

Well done!

- [ ] For any constraint i, if $x_i \neq 0$ then $c_i = \sum_j a_{ij} y_j$.

Well done!

- [ ] For any constraint j, if $b_j \neq \sum_i a_{ij} x_i$ then $y_j = 0$.

Well done!