



Quiz 5

2/2 questions correct

Excellent!

Retake

Next (/learn/approximation-algorithms-part-2/lecture/aOduN/changing-the-form-of-the-lp)



1.

Recall that the *appropriate form* for taking the dual is as follows:

$$\max c \cdot x$$

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

We want to transform the following linear program into an appropriate form for taking the dual.

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

s.t.

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

$$(\text{Constraint 2}) \ x_1 - x_3 \leq -4$$

$$(\text{Constraint 3}) \ -5x_1 + x_2 - 2x_3 \leq 4$$

$$(\text{Constraint 4}) \ 2x_1 - x_2 + x_3 \geq 8$$

$$(\text{Constraint 5}) \ x_1 = 1$$

$$(\text{Constraint 6}) \ x_3 \geq 0$$

Select the constraints that belong to the appropriate form of the LP.

☐ $x_1 \geq 1$

Well done!

☐ $x_3 \geq 0$

Well done!

☐ $-5(x_1^+ - x_1^-) + (x_2^+ - x_2^-) - 2x_3 \leq 4$

Well done!

☐ $-x_1 - x_2 - x_3 \leq -10$

Well done!



2.

We want to transform the following linear program LP1 into an appropriate form for taking the dual.

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

s.t.

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

(Constraint 2) $x_1 - x_3 \leq -4$

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

(Constraint 4) $2x_1 - x_2 + x_3 \geq 8$

(Constraint 5) $x_1 = 1$

(Constraint 6) $x_3 \geq 0$

Let LP2 be the appropriate form of LP1.

Select the correct statement.

- ☐ The value of the optimal solution for LP2 is greater than the value of the optimal solution for LP1

- ☐ The value of the optimal solution for LP2 is smaller than the value of the optimal solution for LP1
- ☐ The value of the optimal solution for LP2 is equal to the value of the optimal solution for LP1

Well done!

