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I am aware that any forms of cheating in this exam will result in a zero grade and a disciplinary investigation. I accept all rules and regulations regarding online exams. I give permission for the processing of my personal data as stated in the Clarification Text provided on the Faculty of Engineering website.

1) Wild west produces two types of cowboy hats. A type 1 hat requires three times as much labor time as type 2. If the all available labor time is dedicated to type 2 alone, the company can produce a total of 450 Type 2 hats a day. The market limits for the two types are 100 and 300 hats per day for type 1 and type 2, respectively. The profit is 3$ per type 1 and 5$ per type 2 hat. Determine the number of hats of each type that would maximize profit.

I. Build mathematical model.

II. Solve the problem graphically.

I) $Z = 3x_1 + 5x_2$

$x_1$: Daily number of type 1 hat

$x_2$: Daily number of type 2 hat

maximize Z.

$$\begin{aligned} 3x_1 + x_2 &\leq 450 \\ x_1 &\leq 100 \\ x_2 &\leq 300 \\ x_1, x_2 &\geq 0 \end{aligned}$$

mathematical model

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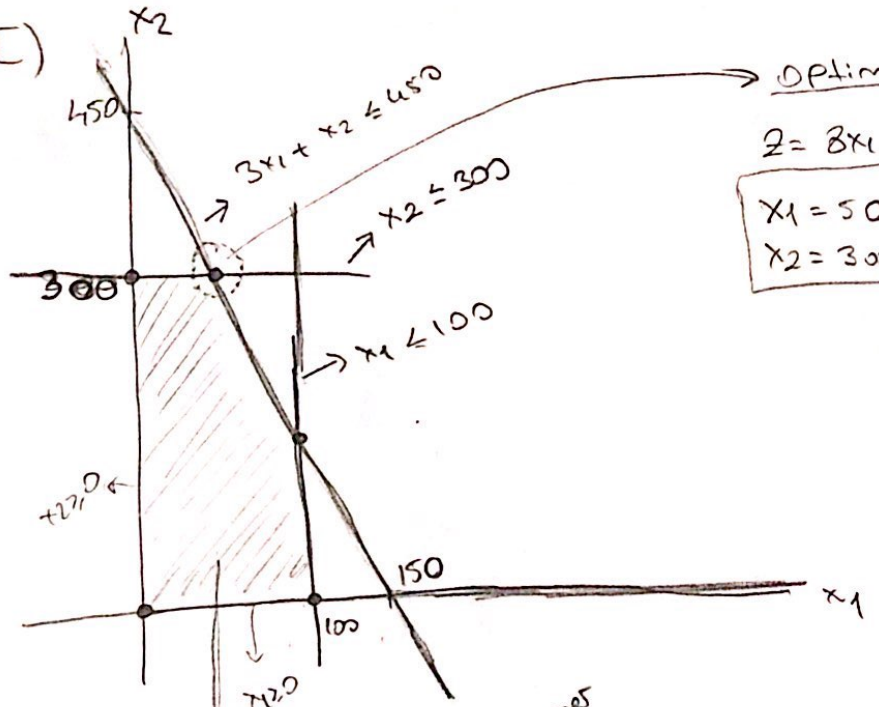
II)

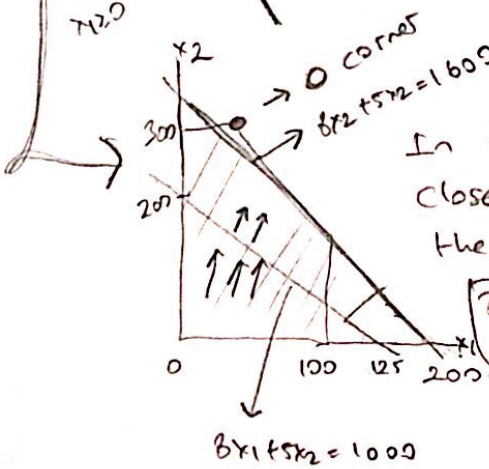



Optimum solution

$Z = 8X_1 + 5X_2$

$X_1 = 50$
$X_2 = 300$

$Z = 400 + 1500$
$= 1900\$$




In this solution space, we are getting close to optimum solution direction of the arrows.

$8X_1 + 5X_2 = 1000$
$8X_2 + 5X_2 = 1600$

These examples prove that optimum solution is in O corner.

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