Diet Problem

- Variables

- Constraints

- Objective

- Formulate an LP (Inequality Form)

Problem Description

- Variables

X18 - Serving of

variable x_j out of n variables)
is the #-of servings (units) of food j

- Healthy Diet Requirement (Constraints)

- For nutrient i (of mutrients) you should have at least l_i amount and at most u_i amount.
- In 1 serving of food j there is a_{ij} amount of nutrient i
- Find the Cheapest Diet (Objective)

1 serving of food j, costs c_j

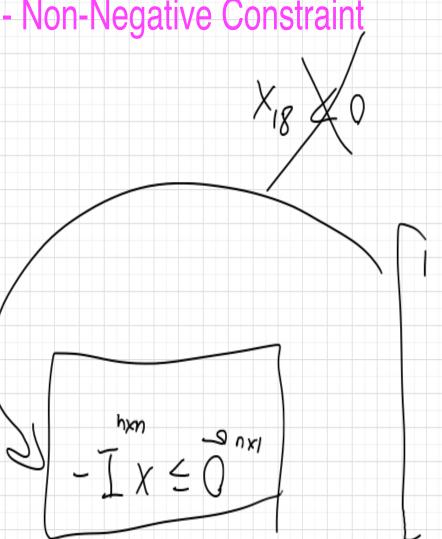
Cip - cost per serving

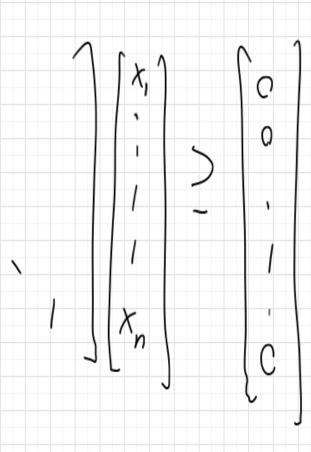
minimize $c^T x$ subject to $Ax \leq b$

- Objective

minimize subject to

- Non-Negative Constraint





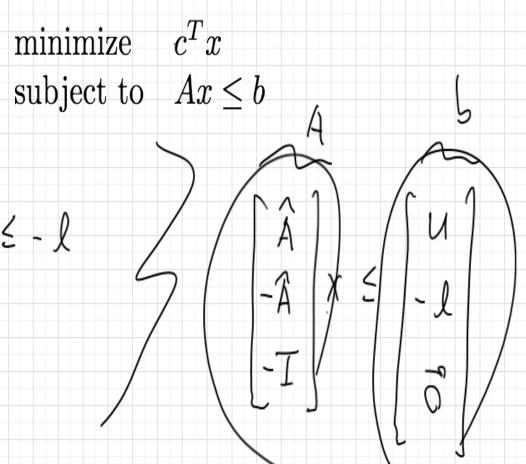
minimize
$$c^T x$$
subject to $Ax \leq b$

- Nutrient Bounds

$$\mathcal{L}_{1} \leq \alpha_{11} x_{1} + \alpha_{12} x_{2} + \cdots - \alpha_{1n} x_{n} \leq u_{1}$$

$$\begin{cases} l_{n} \leq q_{m_{1}} x_{1} + q_{m_{2}} x_{2} + \dots + q_{m_{n}} x_{n} \leq u_{n} \\ l_{1} \end{pmatrix} = l \leq A \times \leq U = \begin{bmatrix} u_{1} & 1 \\ u_{n} & 1 \\ u_{n} & 1 \end{bmatrix}$$

$$Ax \leq u$$



$$\hat{A} = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \ddots & \vdots \\ a_{m1} & a_{m2} & \cdots & a_{mn} \end{bmatrix}$$