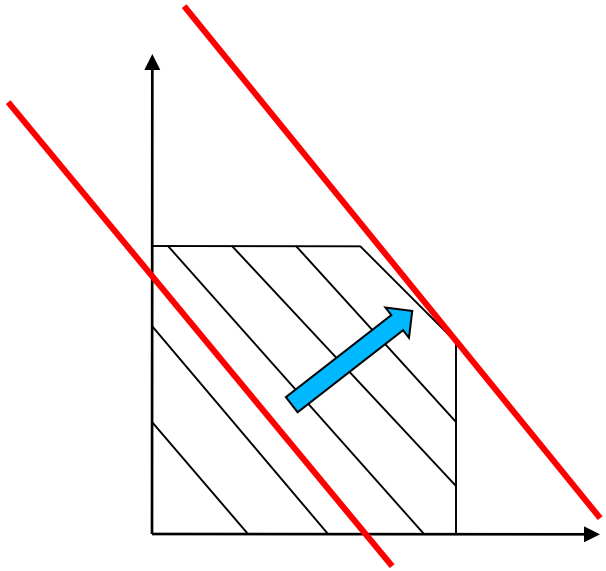
Operations Research



HYUNSOO LEE

Modeling Exercise (1)

- Nutrition

	Rice (100g)	Meat (500g)	Milk (500cc)	Egg (dozen)	Cabbage (100g)	Necessity / 1 day
Calorie (Kcal)	340	1,080	362	1,040	17	2,200
Protein (g)	6.5	167	19	78	1.3	70
Vitamin A (I.U.)	0	97	758	7,080	255	5,000
Iron (mg)	0.4	11	0.3	13	0.3	12.5
Carbohydrate (g)	52	30	25	0	5	-
Cholesterol (u)	0	22	11	120	0	-
Price (Won)	75	1,640	370	550	110	-
Maximum Capacity	**200g**	**500g**	**1,000cc**	**3 dozen**	**300g**	**-**

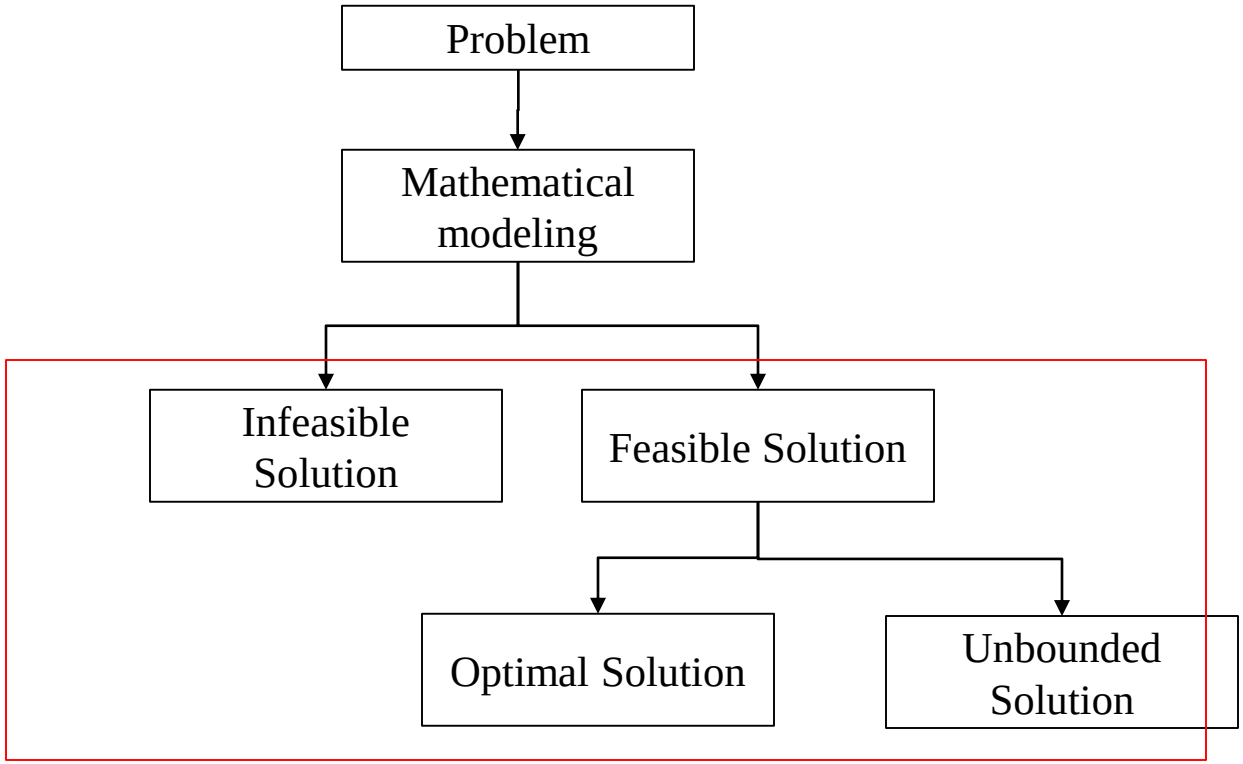
Modeling Exercise (2)

- One product ← two sub-products 5:2 ← 3 Materials
  - 3 facilities
  - Maximize the volume of the product per unit time

Facilities	Needed volume / unit time			Production volume / unit time	
	Material #1	Material #2	Material #3	Sub-Product #1	Sub-Product #2
1	9	5	50	9	6
2	6	8	75	7	10
3	4	11	100	10	6
Maximum Capacity	200	4000	1850	-	-

Types of Solution

- Types of Solution in L.P.

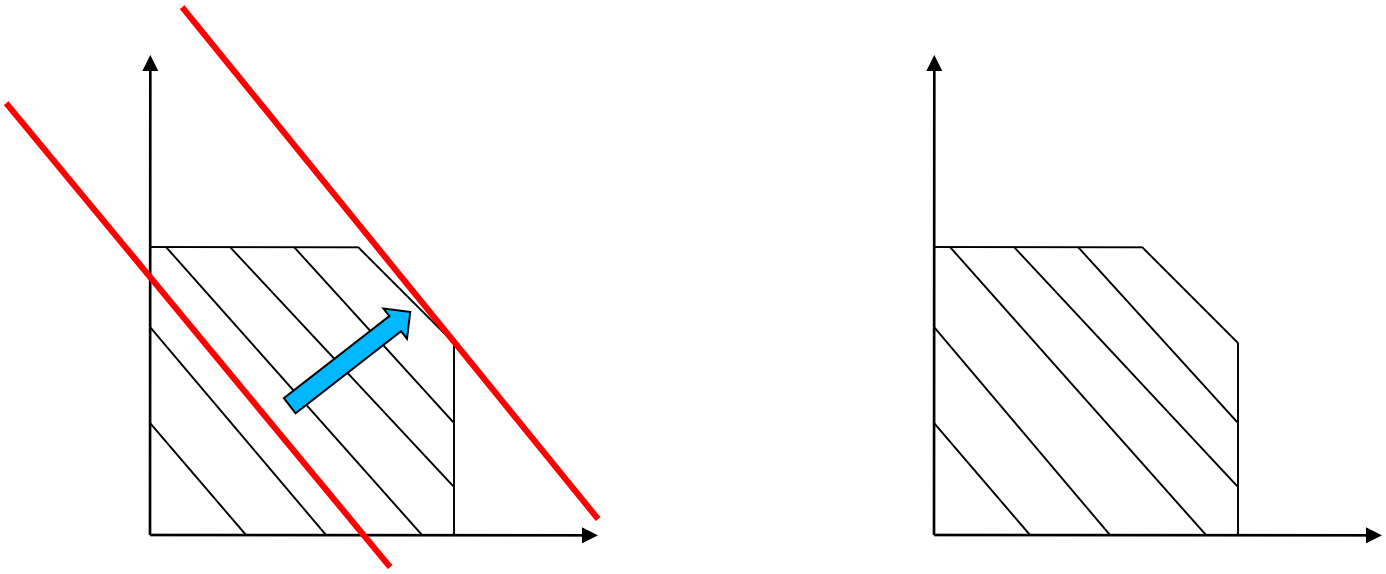


Modeling Structure

- General forms of L.P.
  - Objective Function
  - Constraints
  - Non-negativity

In the Constraints (1)

- Constraint



In the Constraints (2)

- Philosophy of Linear Programming

In the Constraints (3)

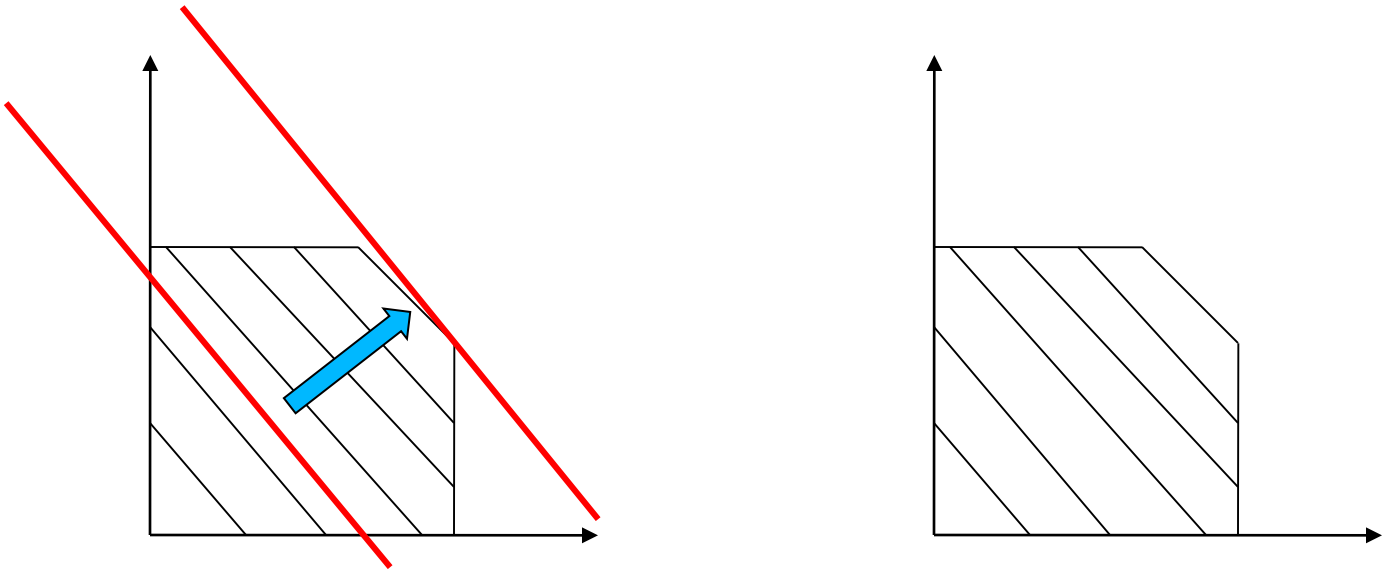
- X

In the Objective Function

- Objective function

And, Next ….. (1)

- Change of X



And, Next….. (2)

- Change of X

Example of L.P.

- Exercise

$$
\begin{aligned}
\textit{Min} \quad & 2x_1 - x_2 \\
\textit{S.t.} \quad & -x_1 + x_2 \le 2 \\
& 2x_1 + x_2 \le 6 \\
& x_1, x_2 \ge 0
\end{aligned}
$$

Summary of Linear Programming

- In L.P.
  - Can you model a Problem?
  - What's your first Basic solution?
  - What's your objective function value?

- Limitations of L.P.
  - Two limitations