LINEAR PROGRAMMING PART IV

ASSUMPTIONS
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I. CONTENTS

Figure 1: Assumptions of LP (Jargons)

Objective

Max Z = 2X_1$ + 3X_2$

Constraint 2: Man-hours

(0.05)*(X_1) + (0.1)*(X_2) ≤ 10 hours

A. PROPORTIONALITY = LINEARITY

- Proportionality in the Objective Function:
    - Every unit increase in X_1 will add $2 linearly.
- Proportionality in the interaction between the Objective Function and the Constraints:
    - Any change in the constraint inequalities will have the proportional change in the objective function.
    - E.g. If we gave more man-hours to Constraint 2, we should see a proportional increase in Z.

B. ADDITIVITY

- Additivity in the Objective Function:
    - Z is made up the sum total of $2X_1$ and $3X_2$
- Additivity in the Constraints:
    - For Constraint 2, the LHS is made up of a sum total of $0.05(X_1)$and $3(X_2)$
- But X_1 and X_2 are purely independent.

C. CONTINUITY

- X_1 and X_2 are continuous.
- Meaning, if X_1 = 17.33333 (or 52/3) units, this is allowed.
- Discrete means 17 units (integer).
- Continuous means 17.33333.
- But how to produce 17.33333 units?
- Simply produce 17 units in the first time period, then produce the 0.3333 in the later time period; or simply produce 18.

D. CERTAINTY

- Objective function coefficients (X_1 and X_2) are calculated with Certainty (through Excel Solver).
- Constraints (raw materials) are pre-known with Certainty.

E. FINITE CHOICES = NON-NEGATIVITY ASSUMPTION

- Output cannot be negative.
- X_1 and X_2 cannot be negative.

REFERENCES

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ABOUT DR ALVIN ANG

Dr. Alvin Ang earned his Ph.D., Masters and Bachelor degrees from NTU, Singapore. He was a Professor as well as a personal/business advisor. More about him at www. AlvinAng.sg.