

Data for Comet Trading Co. problem

Plant	Prod Time per Batch, h		Prod Time Avail, h
	Product		
	1	2	
1	1	0	4
2	0	2	12
3	3	2	18
Profit per batch	30 G	15 G	

The Linear Programming Model

Data Needed:

Resource	Resource Usage per unit Activity			Amount Available
	1	...	n	
1	a_{11}	...	a_{1n}	b_1
:	:		:	:
m	a_{m1}	...	a_{mn}	b_m
Per unit contribution	c_1	...	c_n	

Notation:

- m resources
- n activities
- x_j level of activity j
- Z overall measure of performance
- c_j
- b_i

Standard Form:

Other Forms:

1. Minimizing rather than maximizing the objective function
2. Constraints with a greater-than-or-equal-to inequality
3. Constraints in equation form
4. Unrestricted decision variables

solution
feasible solution
infeasible solution
feasible region
no feasible solutions
optimal solution
most favorable value
multiple optimal solutions
no optimal solutions
unbounded Z
corner-point feasible (CPF) solution

Theorem: Any LP with a bounded feasible region with feasible solutions must possess CPF solutions and at least one optimal solution.

Assumptions of Linear Programming:

1. Proportionality assumption: The contribution of each activity to the value of the objective function is proportional to the level of that activity. Similarly, the contribution of each activity to the LHS of each functional constraint is proportional to the level of the activity.
2. Additivity assumption: Every function is the sum of the individual contributions of the respective activities.
3. Divisibility assumption: Decision variables are allowed to have any values, including noninteger values, that satisfy the functional and nonnegativity constraints. (i.e. activities can run at fractional levels).
4. Certainty assumption: The value assigned to each parameter is assumed to be a known constant.