

MILP · Independent exercises

Instructions

Baseline: maximize $8a+6b-10y_A-8y_B$, subject to $2a+b\leq 12$, $a+b\leq 10$, $a\leq 6y_A$, $b\leq 8y_B$, $a,b\geq 0$ continuous, y_A,y_B binary. Money: \$1,000/week. Reset baseline for each exercise.

For every answer, show the model change, feasible plan, objective, and justification.

1. Integer production

Maximize $3x+2y$ with $x+y\leq 4$, $2x+y\leq 6.5$, and nonnegative integer x,y . Find the optimum and verify it by enumeration.

Working: _____

2. Sales cap 6

Reset the plant model to baseline, then replace $a+b\leq 10$ with $a+b\leq 6$. Compare all four opening patterns.

Working: _____

3. At most one line

Use baseline data and add $y_A+y_B\leq 1$. What is the best opening and production plan?

Working: _____

4. A module costing 8

Use baseline plant data plus an optional module adding 4 labor units. Its weekly cost is 8. Compare buy and do not buy.

Working: _____

5. A minimum batch of 4

Reset to baseline and add $a \geq 4y_A$. Compare opening patterns and determine the optimum.

Working: _____

6. A remaining optimality gap

A maximization MILP has feasible incumbent value 46 and a valid global upper bound 48. What can be concluded?

Working: _____
