ASSIGNMENT– OPTIMIZATION

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1 Solve the following integer programming problem.

1.1

$$\begin{aligned}
max \quad & 9x_1 + 5x_2 + 6x_3 + 4x_4 \\
s.t \quad & 6x_1 + 3x_2 + 5x_3 + 2x_4 \leq 10 \\
& x_1 + x_4 \leq 1 \\
& -x_1 + x_3 \leq 0 \\
& -x_2 + x_4 \leq 0 \\
& x_{1,2,3,4} \in \{0,1\}
\end{aligned}$$

1.2

$$\begin{aligned}
max \quad & 7x_1 + 3x_2 \\
s.t \quad & 5x_1 + 7x_2 \leq 27 \\
& 4x_1 + x_2 \leq 14 \\
& 3x_1 - 2x_2 \leq 9 \\
& x_1, x_2 \geq 0 \\
& x_1 \, Integer
\end{aligned}$$

1.3

$$\begin{aligned}
min \quad & x_1 + x_2 \\
s.t \quad & -3x_1 + 2x_2 \geq 1 \\
& -8x_1 + 10x_2 \leq 10 \\
& x_2 \in \{0,1\} \\
& x_1 \geq 0.3
\end{aligned}$$

1.4

$$\max \quad 120x_1 + 85x_2 + 105x_3 + 140x_4 + 70x_5$$

$$\text{s.t} \quad 55x_1 + 45x_2 + 60x_3 + 50x_4 + 30x_5 \leq 150$$

$$40x_1 + 35x_2 + 25x_3 + 35x_4 + 30x_5 \leq 110$$

$$25x_1 + 20x_2 + 30x_4 \leq 60$$

$$x_3 + x_4 \leq 1$$

$$x_{1,2,3,4,5} \in \{0, 1\}$$