Model 12: Alloy Blending

Decision Variables:
x_1: Pounds of Alloy 1
x_2: Pounds of Alloy 2
x_3: Pounds of Alloy 3
x_4: Pounds of Alloy 4
x_5: Pounds of Alloy 5

Objective: min $19x_1 + 17x_2 + 23x_3 + 21x_4 + 25x_5$
Subject to:

$$\begin{aligned} .60x_1 + .25x_2 + .45x_3 + .20x_4 + .50x_5 &= .40 \\ .10x_1 + .15x_2 + .45x_3 + .50x_4 + .40x_5 &= .35 \\ .30x_1 + .60x_2 + .10x_3 + .30x_4 + .10x_5 &= .25 \\ x_1 + x_2 + x_3 + x_4 + x_5 &= 1 \\ x_1, x_2 &\geq 0 \end{aligned}$$

In Standard Form:
Objective: maximize $-19x_1 - 17x_2 - 23x_3 - 21x_4 - 25x_5$
Subject to

$$\begin{aligned} .60x_1 + .25x_2 + .45x_3 + .20x_4 + .50x_5 &\leq .40 \\ -.60x_1 - .25x_2 - .45x_3 - .20x_4 - .50x_5 &\leq -.40 \\ .10x_1 + .15x_2 + .45x_3 + .50x_4 + .40x_5 &\leq .35 \\ -.10x_1 - .15x_2 - .45x_3 - .50x_4 - .40x_5 &\leq -.35 \\ .30x_1 + .60x_2 + .10x_3 + .30x_4 + .10x_5 &\leq .25 \\ -.30x_1 - .60x_2 - .10x_3 - .30x_4 - .10x_5 &\leq -.25 \\ x_1 + x_2 + x_3 + x_4 + x_5 &\leq 1 \\ -x_1 - x_2 - x_3 - x_4 - x_5 &\leq -1 \\ x_1, x_2, x_3, x_4, x_5 &\geq 0 \end{aligned}$$