Model 11: Cargo

Decision Variables

x_1: Tons of Cargo 1 in front compartment
y_1: Tons of Cargo 1 in center compartment
z_1: Tons of Cargo 1 in back compartment
x_2: Tons of Cargo 2 in front compartment
y_2: Tons of Cargo 2 in center compartment
z_2: Tons of Cargo 2 in back compartment
x_3: Tons of Cargo 3 in front compartment
y_3: Tons of Cargo 3 in center compartment
z_3: Tons of Cargo 3 in back compartment
x_4: Tons of Cargo 4 in front compartment
y_4: Tons of Cargo 4 in center compartment
z_4: Tons of Cargo 4 in back compartment

Objective: maximize

$$280(x_1 + y_1 + z_1) + 360(x_2 + y_2 + z_2) + 320(x_3 + y_3 + z_3) + 250(x_4 + y_4 + z_4)$$

Subject to:

$$\begin{aligned}
x_1 + y_1 + z_1 &\leq 20 \\
x_2 + y_2 + z_2 &\leq 16 \\
x_3 + y_3 + z_3 &\leq 25 \\
x_4 + y_4 + z_4 &\leq 13 \\
x_1 + x_2 + x_3 + x_4 &\leq 12 \\
y_1 + y_2 + y_3 + y_4 &\leq 18 \\
z_1 + z_2 + z_3 + z_4 &\leq 10 \\
500x_1 + 700x_2 + 600x_3 + 400x_4 &\leq 7000 \\
500y_1 + 700y_2 + 600y_3 + 400y_4 &\leq 9000 \\
500z_1 + 700z_2 + 600z_3 + 400z_4 &\leq 5000 \\
\tfrac{1}{12}(x_1 + x_2 + x_3 + x_4) - \tfrac{1}{18}(y_1 + y_2 + y_3 + y_4) &\leq 0 \\
\tfrac{1}{18}(y_1 + y_2 + y_3 + y_4) - \tfrac{1}{12}(x_1 + x_2 + x_3 + x_4) &\leq 0 \\
\tfrac{1}{12}(x_1 + x_2 + x_3 + x_4) - \tfrac{1}{10}(z_1 + z_2 + z_3 + z_4) &\leq 0 \\
\tfrac{1}{10}(z_1 + z_2 + z_3 + z_4) - \tfrac{1}{12}(x_1 + x_2 + x_3 + x_4) &\leq 0 \\
\tfrac{1}{18}(y_1 + y_2 + y_3 + y_4) - \tfrac{1}{10}(z_1 + z_2 + z_3 + z_4) &\leq 0 \\
\tfrac{1}{10}(z_1 + z_2 + z_3 + z_4) - \tfrac{1}{18}(y_1 + y_2 + y_3 + y_4) &\leq 0 \\
x_1, x_2, x_3, x_4, y_1, y_2, y_3, y_4, z_1, z_2, z_3, z_4 &\geq 0
\end{aligned}$$