SoyKing Formulation

The statement of the use case is on Mip Wise's website: mipwise.com/use-cases/freshly.

Decision Variables

The decision variables are the tons of soybean to be carried from each farm to each DC:

- x_{11} - Tons of soybean transfered from Farm F1 to DC D1.
- x_{21} - Tons of soybean transfered from Farm F2 to DC D1.
- x_{31} - Tons of soybean transfered from Farm F3 to DC D1.
- x_{12} - Tons of soybean transfered from Farm F1 to DC D2.
- x_{22} - Tons of soybean transfered from Farm F2 to DC D2.
- x_{32} - Tons of soybean transfered from Farm F3 to DC D2.

Constraints

- Capacity of Farm F1:

$$x_{11} + x_{12} \leq 16.$$

- Capacity of Farm F2:

$$x_{21} + x_{22} \leq 11.$$

- Capacity of Farm F3:

$$x_{31} + x_{32} \leq 23.$$

- Demand of DC D1:

$$x_{11} + x_{21} + x_{31} \geq 20.$$

- Demand of DC D2:

$$x_{12} + x_{22} + x_{32} \geq 25.$$

Objective

The objective is to minimize the total transportantion cost.

$$\min 500z_{11} + 66x_{11} + 500z_{21} + 51x_{21} + 73x_{31} + 54x_{12} + 82x_{22} + 63x_{32}.$$

Final formulation

$$\begin{aligned}
\min \quad & 66x_{11} + 51x_{21} + 73x_{31} + 54x_{12} + 82x_{22} + 63x_{32} \\
\text{s.t.} \quad & x_{11} + x_{12} \leq 16, \\
& x_{21} + x_{22} \leq 11, \\
& x_{31} + x_{32} \leq 23, \\
& x_{11} + x_{21} + x_{31} \geq 20, \\
& x_{12} + x_{22} + x_{32} \geq 25, \\
& x_{11}, x_{21}, x_{31}, x_{12}, x_{22}, x_{32} \geq 0.
\end{aligned} \tag{1}$$