Module 06 – Transshipment Problem

Exploratory Data Analysis

A diagram of a variety of food items

AI-generated content may be incorrect.

Model Formulation

*Write the formulation of the model into here prior to implementing it in your Excel model. Be explicit with the definition of the decision variables, objective function, and constraints.*

*Hint: This one differs a bit from the sample problem in terms of Balance-of-Flow*

MIN:

43X\_04 + 36X\_06 + 30X\_08 + 29X\_15 + 38X\_24 + 31X\_26 + 30X\_27 + 30X\_45 + 33X\_48 + 41X\_56 + 33X\_57 + 29X\_58 + 40X\_74 + 47X\_83 + 49X\_85 + 31X\_86

Constraints:

-X\_04 – X\_06 – X\_08 <= -342

-X\_15 <= -214

-X\_24 - X\_26 – X\_27 <= -340

X\_83 <= 133

-X\_45 – X\_48 + X\_04 + X\_74 <= 133

-X\_56 – X\_57 – X\_58 + X\_85 <=166

X\_06 + X\_56 + X\_86 <=200

-X\_74 + X\_27 + X\_57

-X\_83 – X\_85 – X\_86 + X\_06 + X\_48 + X\_58 <=235

X\_ij >= 0 for all I and j

Model Optimized for Minimal Transportation Cost

*Implement your formulation into Excel and be sure to make it neat. This section should include:*

A screenshot of a computer

AI-generated content may be incorrect.*This model recommends shipment amounts from warehouses and between retailers for the optimal solution displaying the lowest possible total cost*

* *Update your graph from the EDA section to bold/color the links being used (and show how much is going through that link)*

A diagram of a graph

AI-generated content may be incorrect.

Model with Stipulation

*Please copy the tab of your original model before continuing with the next part to avoid messing up your original solution.*

*Follow these steps to complete this section:*

1. *Describe the necessity of the Balance-of-Flow for this problem type*

Since total demand is greater than the total supply, the constraints in the model must be adapted to account for the shortage of supply. Otherwise, the model will be infeasible to solve.

1. *What happens when you change your model to make Total Supply > Total Demand (i.e. add 115 units to one of the sources)*

When total supply is made greater than total demand, solver can no longer find a feasible solution

1. *What happens when you rerun your model?*

Solver cannot find a feasible solution

1. *What do you need to change to make your model work again?*

To satisfy the network flow demands, the constraint in solver must be amended to reflect a greater than function.

1. *Make the changes and report on your findings.*

Upon implementing the changes into the model, solver can once again find a feasible solution.