OptimisticSMP Model Documentation

The *OptimisticSMP* model is a linear programming problem aimed at maximizing profit by allocating inventory or purchases of SMP to sales, given supply and demand constraints.

Decision Variables: $X_{i,j}$ represents the quantity allocated from purchase i to sale j, restricted to non-negative values.

Objective: Maximize $\sum(S_j - P_i - C_{i,j}) \cdot X_{i,j}$, where S_j is the selling price, P_i is the purchase price, and $C_{i,j}$ is the freight cost.

Constraints:

- *Supply*: $\sum_j X_{i,j} \leq Q_i$ for each purchase i, ensuring allocations do not exceed availability.
- *Demand*: $\sum_i X_{i,j} = D_j$ for each sale j, requiring exact demand fulfillment.
- *Compatibility*: Only allocations between approved seller-buyer pairs and where purchase dates precede sale dates are allowed.

Considerations:

- The model assumes linear freight costs according to indicated term and does not account for potential nonlinearities e.g. volume discounts.
- Delivery dates are assumed to include a lead time buffer as constraints cannot be met otherwise.