

Streaming Package Optimization Model

Sets and Parameters

- Packages: Set of streaming packages, indexed by p .
- Games: Set of games, indexed by g .
- StartDates: Set of possible subscription start dates, indexed by d .
- AdjustedCost_Month[p]: Adjusted monthly subscription cost for package p ($\text{Cost_Month}[p] + 1$).
- AdjustedCost_Year[p]: Adjusted yearly subscription cost for package p ($\text{Cost_Year}[p] + 12$).
- CoverageMonth[d]: Games covered by a rolling monthly subscription starting on d .
- CoverageYear[d]: Games covered by a rolling yearly subscription starting on d .
- P_g[g]: Packages that can stream game g .

Decision Variables

- $z_month_{p,d} \in \{0, 1\}$: Binary variable indicating if package p is activated for a monthly subscription starting on date d .
- $z_year_{p,d} \in \{0, 1\}$: Binary variable indicating if package p is activated for a yearly subscription starting on date d .

Objective Function

Minimize the total adjusted cost of subscriptions:

$$\min \sum_{p \in \text{Packages}} \sum_{d \in \text{StartDates}} (\text{AdjustedCost_Month}[p] \cdot z_month_{p,d} + \text{AdjustedCost_Year}[p] \cdot z_year_{p,d})$$

Constraints

1. **Game Coverage:** Ensure each game g is covered by at least one package:

$$\sum_{p \in \text{P_g}[g]} \sum_{d \in \text{StartDates} | g \in \text{CoverageMonth}[d]} z_month_{p,d} + \sum_{d \in \text{StartDates} | g \in \text{CoverageYear}[d]} z_year_{p,d} \geq 1, \quad \forall g \in \text{Games}$$

2. **Binary Constraints:** Ensure variables are binary:

$$z_month_{p,d}, z_year_{p,d} \in \{0, 1\}, \quad \forall p \in \text{Packages}, \forall d \in \text{StartDates}$$

Post-Processing

The actual total cost is calculated as:

$$\text{ActualCost} = \text{ObjectiveValue} - \sum_{p \in \text{Packages}} (\text{NumStartDates})$$

where NumStartDates is the total number of possible subscription start dates.