Team Financial & Salary Model

1. Revenue and Cost Function

The revenue of Team i at time t, denoted as $Rev_{T_i}(t)$, is modeled as:

$$Rev_{T_i}(t) = \lambda_1 Win_i(t) + \lambda_2 \ln(Win_i(t-1)) + \lambda_3 t + \lambda_4 MS_i + C \tag{1}$$

where MS represents the Market Size.

The total cost $Cost_{T_i}(t)$ is defined as:

$$Cost_{T_i}(t) = \sum Sal_{p,i}(t) + \text{Lux\_Tax}_i(t) \tag{2}$$

The Operating Income $O\_InT_i(t)$ is:

$$O\_InT_i(t) = Rev_{T_i}(t) - Cost_{T_i}(t) \tag{3}$$

2. Player Salary & Risk

Player salary is proportional to their total score:

$$Sal_{p,i}(t) = r \cdot \text{Total\_Score}_{p,i}(t) \tag{4}$$

The risk factor is modeled as:

$$Risk(t) = L_1 \frac{\sum Sal_{p,i}}{Rev_{T_i}(t)} + L_2 \text{Var}(A - S) \tag{5}$$

3. Salary Cap & Restrictions

The Salary Cap is determined by the league's total revenue (sharing 51% among 30 teams):

$$Sal\_Cap = \frac{\sum_{i=1}^{30} Rev_{T_i}(t) \times 51\%}{30} \tag{6}$$

Minimum Salary Floor Restriction:

$$\sum Sal_{p,i} \geq 0.9 \cdot Sal\_Cap \tag{7}$$

4. Apron Rules (Hard Caps)

We define two "Apron" thresholds based on the Salary Cap:

$$Ap_1 = 1.3 \cdot Sal\_Cap \tag{8}$$

$$Ap_2 = 1.5 \cdot Sal\_Cap \tag{9}$$

Penalties:

- If $Rev_{T_i}(t) > Ap_1$: Add a constant penalty PN to the cost.
- If $Rev_{T_i}(t) > Ap_2$: Revenue $Rev_{T_i}(t)$ stops increasing (Growth Cap).

5. Luxury Tax Mechanism

The Luxury Tax Line is set at:

$$Lux\_Line = 1.2 \cdot Sal\_Cap \tag{10}$$

The tax bracket width W is adjusted based on the cap growth (benchmarked to 2023-24):

$$W = 5M \times \frac{Sal\_Cap}{Sal\_Cap_{2023-2024}} \tag{11}$$

Let X be the taxable amount (amount exceeding the tax line):

$$X = \sum Sal_{p,i} - Lux\_Line \tag{12}$$

(Note: Handwritten implies X related to Rev, but logically Luxury Tax is based on Salary. Adjusted here for logical consistency based on "Lux-Tax" context).

The progressive luxury tax is calculated as:

$$Lux\_Tax_{T_i} = \sum_{j=0}^{n} \min(X - jW, W) \times T_j \tag{13}$$

where $\min(X - jW, W)$ represents the amount falling into the j-th bracket (clamped by width W).

Tax Rates (T_j):

Range (Excess X)	**Tax Rate (T_j)**
$0 \sim W$	1.50
$W \sim 2W$	1.75
$2W \sim 3W$	2.50
$3W \sim 4W$	3.25
$> 4W$	+0.5 per bracket