PBAS formulation

Formulation of the problem to determine width and height of the substrate. By using different scenarios to encounter the uncertainties.

1 Decision Variables

w = width of the substrate
h = height of the substrate
x_{it} = the number of substrates for product i at time t
W_{is} = Number of product i that fits horizontally on substrate for scenario s (INTEGER)
H_{is} = Number of products i that fits vertically on substrate for scenario s (INTEGER)

2 Constraints

$$W_{is} \leq \frac{w}{width_{is} + exlusion} \quad i \in Product, s \in Scenario \tag{1}$$

$$H_{is} \leq \frac{h}{width_{is} + exlusion} \quad i \in Product, s \in Scenario \tag{2}$$

$$ApS_{is} = W_{is} * H_{is} \quad i \in Product, s \in Scenario \tag{3}$$

Where ApS_{is} is the total amount of products at one substrate at scenario s.

$$Profit_{its} = (Price_{its}*Yield_{its}*ApS_{is}) - (Cost_{ts}*(w*h)) \quad i \in Product, t \in Time, s \in Scenario \tag{4}$$

$$\sum_{i \in Product} x_{it} \leq 12 * 60000 \quad \forall t$$

(5)

Where 12*60000 is the upper limit of substrate for each year.

3   Objective

$$max\frac{1}{N}\sum_i\sum_t\sum_s Profit_{its} * x_{it} \tag{6}$$

Where N is the number of scenarios.