ie400-project-q2

Data

option\years	2021	2022	2023	2024
1	0.26	0.0	0.26	0.0
2	0.12	0.12	0.12	0.12
3	0.19	0.19	0.0	0.0
4	0.0	0.27	0.27	0.0
5	0.0	0.39	0.0	0.0
6	0.0	0.0	0.28	0.0

$P_{ij} =$ Profit ratio of the optin i at year j

option	duration
1	2
2	1
3	3
4	2
5	3
6	2

D_i = Duration of the option i

	max1	max2	max3
contribution	0.4	0.1	0.05

c_k = bonus contribition ratio, $1 \leq k \leq 3$

Decision Varriables

$x_{ij} =$ The amount invested to the option i at the end of year j
$x_{ij}\ is\ integer$
$1 \leq i \leq 6$
$1 \leq j \leq 5$ shows year $(2020 + j)$

$max_1\ =$ option that is most invested from 2021 to 2025 total.

max_2 = option that is second most invested from 2021 to 2025 total.

max_3 = option that is third most invested from 2021 to 2025 total.

Constraints

$max(\sum_{i=1}^{6} x_{i5} + \ 0.4 * max_1 + 0.1 * max_2 + 0.05 * max_3)$

$s.t$

$\sum_{i=1}^{6} x_{i1} = 14000$

$\sum_{i=1}^{6} x_{i2} = 1.12 * x_{21}$

$\sum_{i=1}^{6} x_{i3} = 1.12 * x_{22} + 1.26 * x_{11}$

$\sum_{i=1}^{6} x_{i4} = 1.12 * x_{23} + 1.19 * x_{31} + 1.27 * x_{42}$

$\sum_{i=1}^{6} x_{i4} = 1.12 * x_{24} + 1.26 * x_{13} + 1.19 * x_{31} + 1.27 * x_{42} + 1.39 * x_{52} + 1.28 * x_{63}$

$max_1 >= \sum_{j=1}^{5} x_{1j}$

$max_1 >= \sum_{j=1}^{5} x_{2j}$

$max_1 >= \sum_{j=1}^{5} x_{3j}$

$max_1 >= \sum_{j=1}^{5} x_{4j}$

$max_1 >= \sum_{j=1}^{5} x_{5j}$

$max_1 \ \geq \ max_2$

$max_2 \ \geq \ max_3$