Phoenix Fee Distribution

August 1, 2023

[58]:
```
import pulp as p
```

[59]:
```
# create lp max problem
lp = p.LpProblem("Phoenix_Fee", p.LpMaximize)
```

[60]:
```
# create variables
# a: bruno
# b: phoenix
# c: pulsarz
# d: kras
# e: kushti
# f: bank fee
# g: dev fee

# keep these the two params the same as initial implementation
f = 0.03
g = 0.1*f

a = p.LpVariable("a", lowBound = 0)
b = p.LpVariable("b", lowBound = 0)
c = p.LpVariable("c", lowBound = 0)
d = p.LpVariable("d", lowBound = 0)
e = p.LpVariable("e", lowBound = 0)
```

[61]:
```
# objective function
lp += (a + b + c + d + e)
```

[62]:
```
# constraints
lp += a >= 0.025 * (f/g)
lp += b >= a
lp += c >= a
lp += a <= (a + b + c) / 3
lp += b <= (a + b + c) / 3
lp += c <= (a + b + c ) / 3
lp += d >= 0.1
lp += d <= a
lp += e >= d
```

```
lp += e <= a
lp += a + b + c + d + e <= 1
```

[63]:
```
# solution
print(lp)
```

```
Phoenix_Fee:
MAXIMIZE
1*a + 1*b + 1*c + 1*d + 1*e + 0
SUBJECT TO
_C1: a >= 0.25

_C2: - a + b >= 0

_C3: - a + c >= 0

_C4: 0.666666666667 a - 0.333333333333 b - 0.333333333333 c <= 0

_C5: - 0.333333333333 a + 0.666666666667 b - 0.333333333333 c <= 0

_C6: - 0.333333333333 a - 0.333333333333 b + 0.666666666667 c <= 0

_C7: d >= 0.1

_C8: - a + d <= 0

_C9: - d + e >= 0

_C10: - a + e <= 0

_C11: a + b + c + d + e <= 1

VARIABLES
a Continuous
b Continuous
c Continuous
d Continuous
e Continuous
```

[64]:
```
# solving
status = lp.solve()
print(p.LpStatus[status])
print(p.value(a), p.value(b), p.value(c), p.value(d), p.value(e), p.value(lp.
  ↪objective))
```

```
Welcome to the CBC MILP Solver
```

```
Version: 2.10.3
Build Date: Dec 15 2019

command line - /home/luca/.local/lib/python3.10/site-
packages/pulp/solverdir/cbc/linux/64/cbc
/tmp/e16f313bb3ad41eeab98abe09afa9192-pulp.mps max timeMode elapsed branch
printingOptions all solution /tmp/e16f313bb3ad41eeab98abe09afa9192-pulp.sol
(default strategy 1)
At line 2 NAME          MODEL
At line 3 ROWS
At line 16 COLUMNS
At line 48 RHS
At line 60 BOUNDS
At line 61 ENDATA
Problem MODEL has 11 rows, 5 columns and 26 elements
Coin0008I MODEL read with 0 errors
Option for timeMode changed from cpu to elapsed
Presolve 7 (-4) rows, 5 (0) columns and 20 (-6) elements
Perturbing problem by 0.001% of 1 - largest nonzero change 9.4100543e-05 (
0.0094100543%) - largest zero change 0
0  Obj 0.64995009 Primal inf 0.749995 (5) Dual inf 4.9996722 (5)
4  Obj 0.99992923
Optimal - objective value 1
After Postsolve, objective 1, infeasibilities - dual 0 (0), primal 0 (0)
Optimal objective 1 - 4 iterations time 0.002, Presolve 0.00
Option for printingOptions changed from normal to all
Total time (CPU seconds):       0.00   (Wallclock seconds):       0.00

Optimal
0.25 0.25 0.25 0.1 0.15 1.0
```