

Prints (Relatório 1)

#1

```
simul.summary()

Metabolites: 1877
Reactions: 2712
Genes: 1516
```

#2

	Reaction ID	Flux rate
0	EX_lac_L_e	0.0
1	EX_lac_D_e	0.0

	Reaction ID	Flux rate
0	EX_glc_e	0.0
1	EX_glc_D_e	-10.0
2	EX_glc_e	0.0
3	EX_2ddglcn_e	0.0
4	EX_glc_e	0.0
5	EX_glc_e	0.0
6	EX_udpglc_e	0.0
7	EX_5dglcn_e	0.0
8	EX_2dglc_e	0.0
9	EX_metglc_e	0.0

	Reaction ID	Flux rate
0	BIOMASS_Ec_iML1515_core_75p37M	0.876997
1	BIOMASS_Ec_iML1515_WT_75p37M	0.000000

	Reaction ID	Flux rate
0	EX_co2_e	24.003293
1	EX_h2o2_e	0.000000
2	EX_no2_e	0.000000
3	EX_so2_e	0.000000
4	EX_o2_e	-22.131763
5	EX_o2s_e	0.000000

#3

```
const = {'EX_glc_D_e' : (-15.0, 100000.0),
        'EX_o2_e' : (0,10000)}

print(simul.FVA(reactions=["EX_lac_L_e"], constraints = const))
print(simul.FVA(reactions=["EX_lac_D_e"], constraints = const))

{'EX_lac_L_e': [0.0, 1.114181818181784]}
{'EX_lac_D_e': [0.0, 12.255999999999567]}
```

#4

```
print(best_val_l)
print(best_val_d)

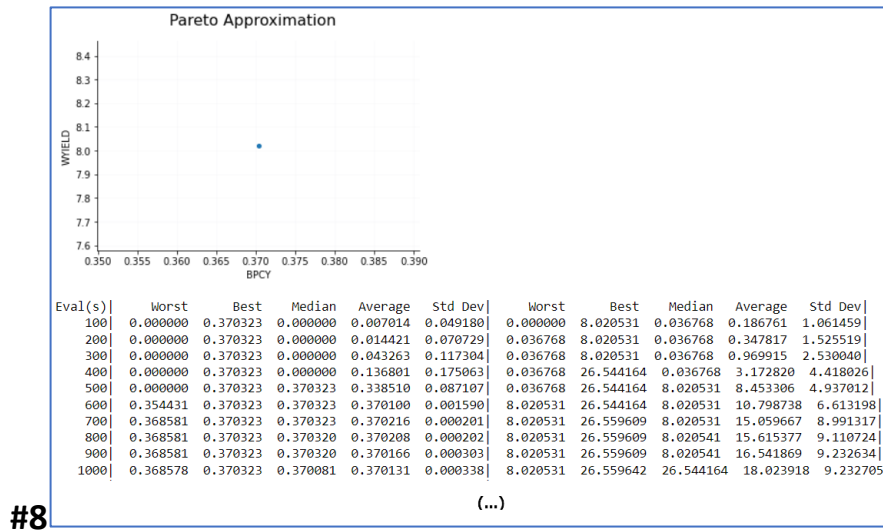
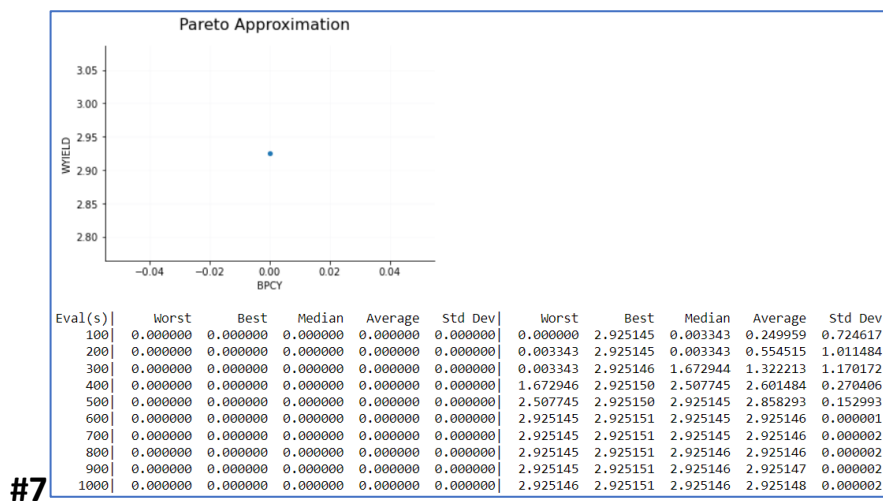
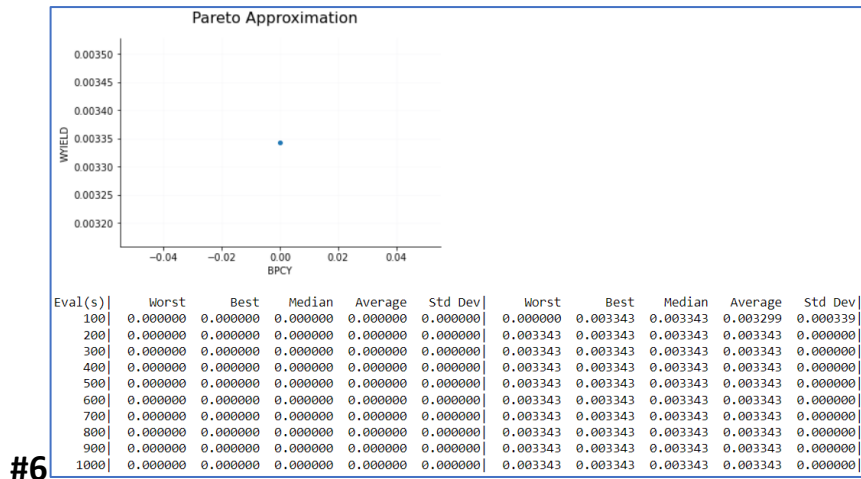
[]
[('s0001', 6.86)]
```

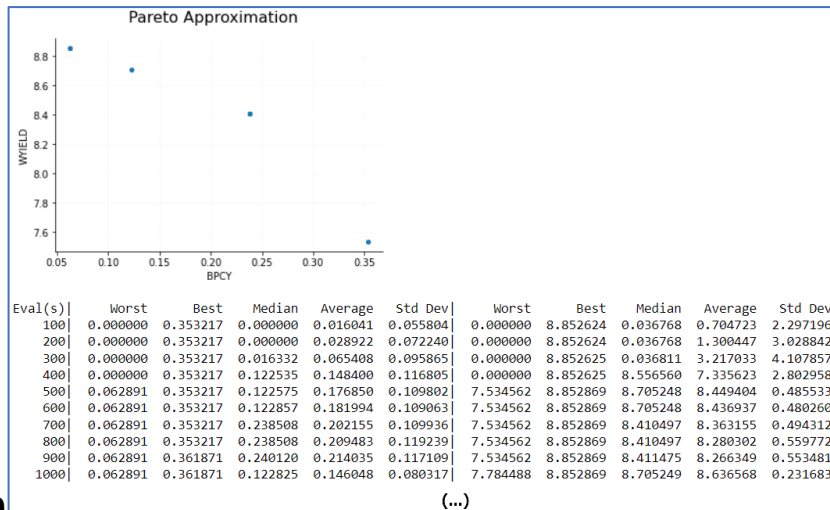
#5

```
from mewpy.problems import GKOPProblem

problem = GKOPProblem(model, [])
c = problem.solution_to_constraints({"s0001":0})
result = simul.simulate(method="pFBA", constraints = c)
result.fluxes["BIOMASS_Ec_iML1515_core_75p37M"]

0.0
```





#9

#10 [0.3700803194305872, 26.544171601337318];{'ACKr': 0, 'ACALD': 0}

```
const = {"ACKr":(0,0), "ACALD":(0,0), 'EX_glc_D_e' : (-15.0, 100000.0), 'EX_o2_e' : (0,10000)}
result = simul.simulate(method="pFBA", constraints = const)

print(result.find("EX_lac_D_e"))
print()
print(simul.FVA(reactions=["EX_lac_D_e"], constraints = const))
print()
print()
print(result.find("BIOMASS_Ec_iML1515_core_75p37M"))
print()
print(simul.FVA(reactions=["BIOMASS_Ec_iML1515_core_75p37M"], constraints = const))
```

Reaction ID	Flux rate
0 EX_lac_D_e	26.668039

```
{'EX_lac_D_e': [11.570203860940747, 27.230339294122086]}
```

Reaction ID	Flux rate
0 BIOMASS_Ec_iML1515_core_75p37M	0.208159

#11

Gene Reaction Rule:
b2296 or b1849 or b3115

Genes:

b3115 (tdcD)

b1849 (purT)

b2296 (ackA)

#12

Gene Reaction Rule:
b0351 or b1241

Genes:

b1241 (adhE)

b0351 (mhpF)

#13

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