

# Assignment 19 - DoCplex

June 11, 2019

## 1 Assignment 19 - DoCplex

### 1.0.1 Problem

Express the product mix model studied today in DoCplex and solve it.

### 1.0.2 Resolution

We can find the following situation to optimize:

$$\text{Max : } Z = 3X_1 + 5X_2$$

*s.t.*

$$X_3 + X_4 + X_5 = 10$$

$$X_1 \leq 40X_3$$

$$2X_2 \leq 40X_4$$

$$3X_1 + 2X_2 \leq 40X_5$$

So we make the following implementation with DoCplex:

```
In [11]: from docplex.mp.model import Model

mdl = Model(name="Products")

nbProd1 = mdl.integer_var(name="nbProd1")
nbProd2 = mdl.integer_var(name="nbProd2")
nbWork1 = mdl.integer_var(name="nbWork1")
nbWork2 = mdl.integer_var(name="nbWork2")
nbWork3 = mdl.integer_var(name="nbWork3")

mdl.add_constraint( nbWork1 + nbWork2 + nbWork3 == 10, "workers")
mdl.add_constraint( nbProd1 <= 40*nbWork1, "Plant1")
mdl.add_constraint( 2*nbProd2 <= 40*nbWork2, "Plant2")
mdl.add_constraint( 3*nbProd1 + 2*nbProd2 <= 40*nbWork3, "Plant3")

mdl.maximize(3*nbProd1 + 5*nbProd2)
```

```
mdl.parameters.threads = 4
mdl.solve(log_output=False)

print("The optimal values obtained are:")
print("Product 1:", nbProd1.solution_value)
print("Product 2:", nbProd2.solution_value)
print("Workers plant 1:", nbWork1.solution_value)
print("Workers plant 2:", nbWork2.solution_value)
print("Workers plant 3:", nbWork3.solution_value)
```

The optimal values obtained are:

Product 1: 0

Product 2: 100.0

Workers plant 1: 0

Workers plant 2: 5.0

Workers plant 3: 5.0

In [ ]: