Correction De Controle

1. La corrélation de Pearson entre Data1 et Data2:

$$r_1 = 1.$$

2.La corrélation de rang entre Data1 et Data2:

$$r = 1 - \frac{6\sum(dr_i)^2}{n(n^2(n-1)}$$

$$r = 1 - \frac{6\sum(0+0+0)^2}{3(3^2(3-1)}$$

$$r = 1$$

3.La corrélation entre la Data1 et Data3:

$$r = \frac{(x_1 - x_0)\sqrt{(n_1.n_0)}}{n\sigma_x}$$

$$r = \frac{(1-15.5)\sqrt{(1*2)}}{3*8.5}$$

$$r = 0.80$$

La relation entre Data2 et Data3:
- Data1 et Data2 sont fortement relier (1).
- Data2 et Data 1 sont fortemnt relier (2).
- Data1 et Data3 sont fortement relier (3).
- Alors Data2 et Data3 sont relier.

Exercice 2)

$$\sum_i^n (x_i - \bar{x})(y_i - \bar{y}) = \sum_i^n (x_i y_i) - n\bar{x}\bar{y}$$

$$\sum_i^n x_i * y_i - \sum_i^n x_i * \bar{y} - \sum_i^n \bar{x} * y_i + \sum_i^n \bar{x} * \bar{y}$$

$$\sum_i^n x_i * y_i - \bar{y}\sum_i^n x_i - \bar{x}\sum_i^n y_i + \sum_i^n \bar{x} * \bar{y}$$

$$\sum_i^n x_i * y_i - n\bar{y}\bar{x} - n\bar{x}\bar{y} + n\bar{x}\bar{y}$$

$$\sum_i^n (x_i y_i) - n\bar{x}\bar{y}$$

Exercice N:3) y=a1x+b1

$$a_1 = \frac{121429 - 10 * 28.2 * 404.8}{\sqrt{8766 - 10 * 28.2 * 28.2}\sqrt{1719370 - 10 * 404.8 * 404.8},}$$

$$cov(x, y) = \sum_{i}^{n} (x_i - \bar{x})(y_i - \bar{y})/n$$

```
c1=121429-10*28.2*404.8
c2=8766-10*28.2*28.2
c3=1719370-10*404.8*404.8
a1=c1/sqrt(c2*c2)
a1
```

```
## [1] 8.942232
```

```
surface=c(17,18,19,22,27,31,32,33,36,47)
loyer=c(390,305,310,320,396,427,370,430,480,620)
```

b=mean(loyer)-a1*mean(surface)

```
b=mean(loyer)-a1*mean(surface)
b
```

```
## [1] 152.6291
```

$$R^2 = \frac{SCE}{SCT}$$

```
y_ess=a1*surface+b
y_ess
```

```
##  [1] 304.6470 313.5892 322.5315 349.3582 394.0693 429.8382 438.7805 447.7227
##  [9] 474.5494 572.9140
```

```
  SCE=sum((y_ess-mean(loyer))*(y_ess-mean(loyer)))
SCE
```

```
## [1] 65058.32
```

```
SCT=sum((loyer-mean(loyer))*(loyer-mean(loyer)))
SCT
```

```
## [1] 80739.6
```

```
SCE/SCT
```

```
## [1] 0.8057795
```

ALORS

$$R^2 = 0.8058$$