# Atelier 4

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```
nutriage <- read.csv("~/Descargas/Atelier4-master/nutriage.csv")
names(nutriage)
```

```
##  [1] "sexe"               "situation"          "the"
##  [4] "cafe"               "taille"             "poids"
##  [7] "age"                "viande"             "poisson"
## [10] "fruit_crus"         "fruit_legume_cuits" "chocol"
## [13] "matgras"
```

$X \equiv$ taille cm $N(\mu, \sigma)$

```
mu <- mean(nutriage$taille)
sigma <- sd(nutriage$taille)
mu
```

```
## [1] 163.9602
```

```
sigma
```

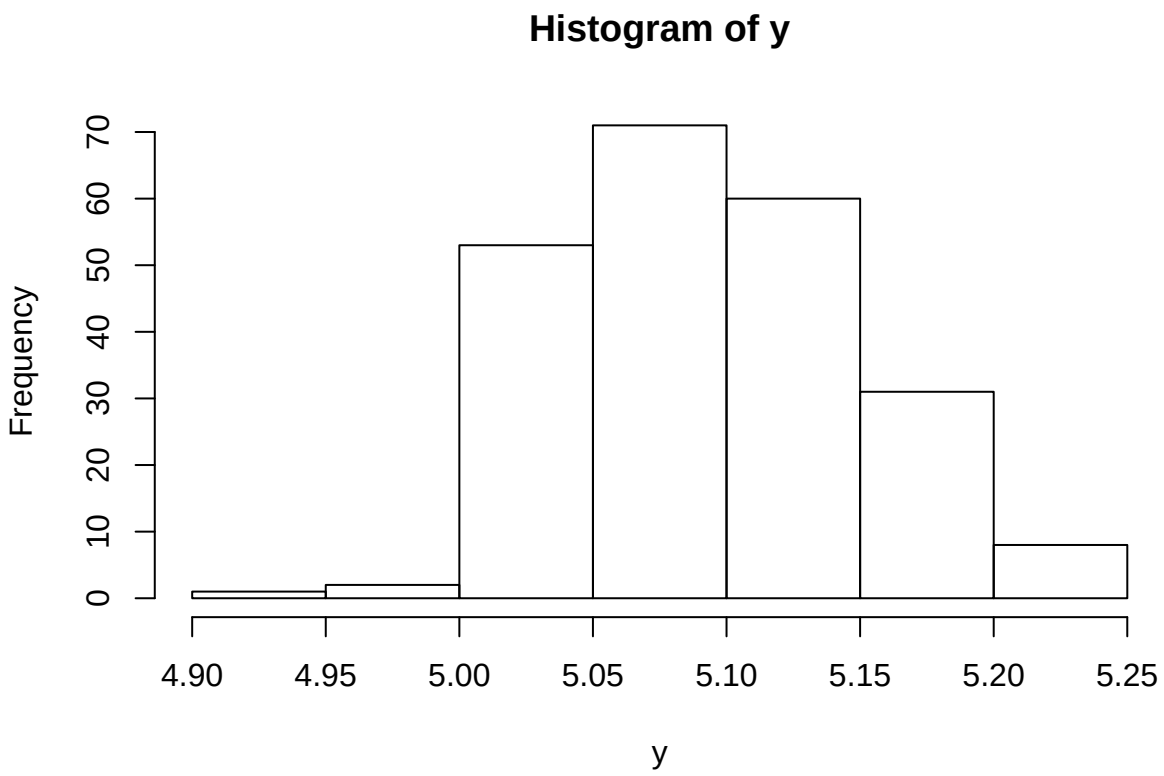
```
## [1] 9.003368
```

```
proba_negative <- pnorm(0,mu,sigma)
proba_negative
```

```
## [1] 2.111475e-74
```

Soit $X = e^y$ avec $y \sim N(\mu, \sigma)$ alors $y = \ln(X)$

```
y <- log(nutriage$taille)
hist(y)
```




```
mu_y <- mean(y)
sigma_y <- sd(y)
mu_y
```

```
## [1] 5.09814
```

```
sigma_y
```

```
## [1] 0.05445098
```

Est-ce que $y$ est une distribution normal?

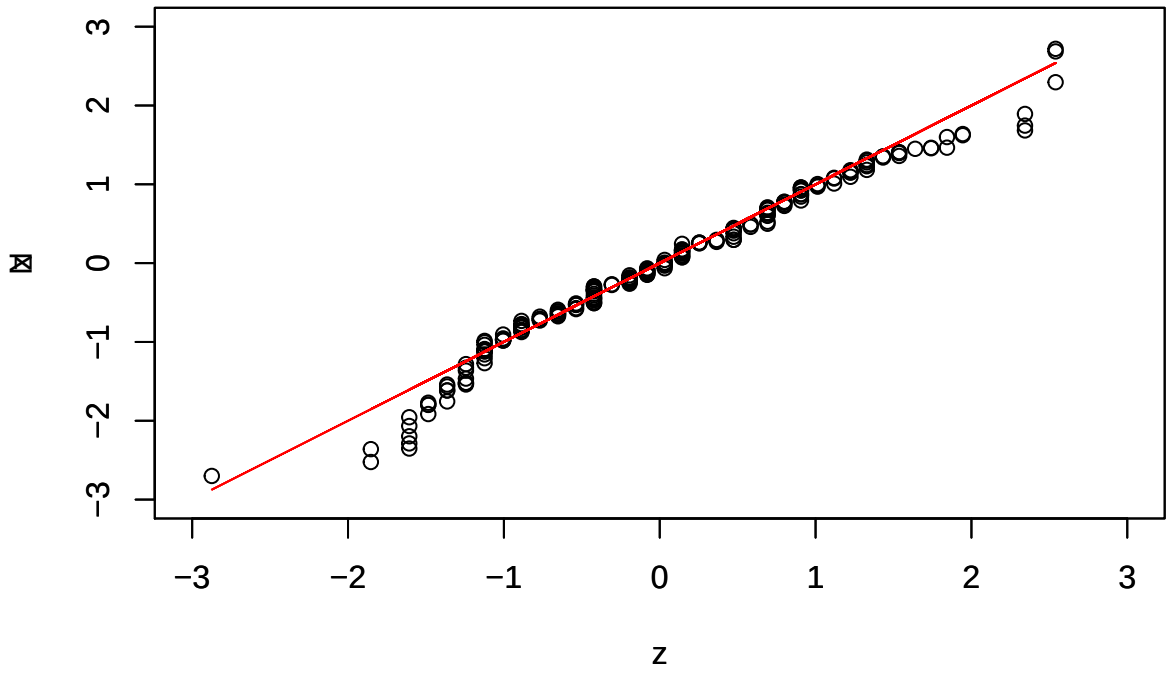
```
z <- (y-mu_y)/sigma_y
mean(z)
```

```
## [1] -1.37686e-15
```

```
sd(z)
```

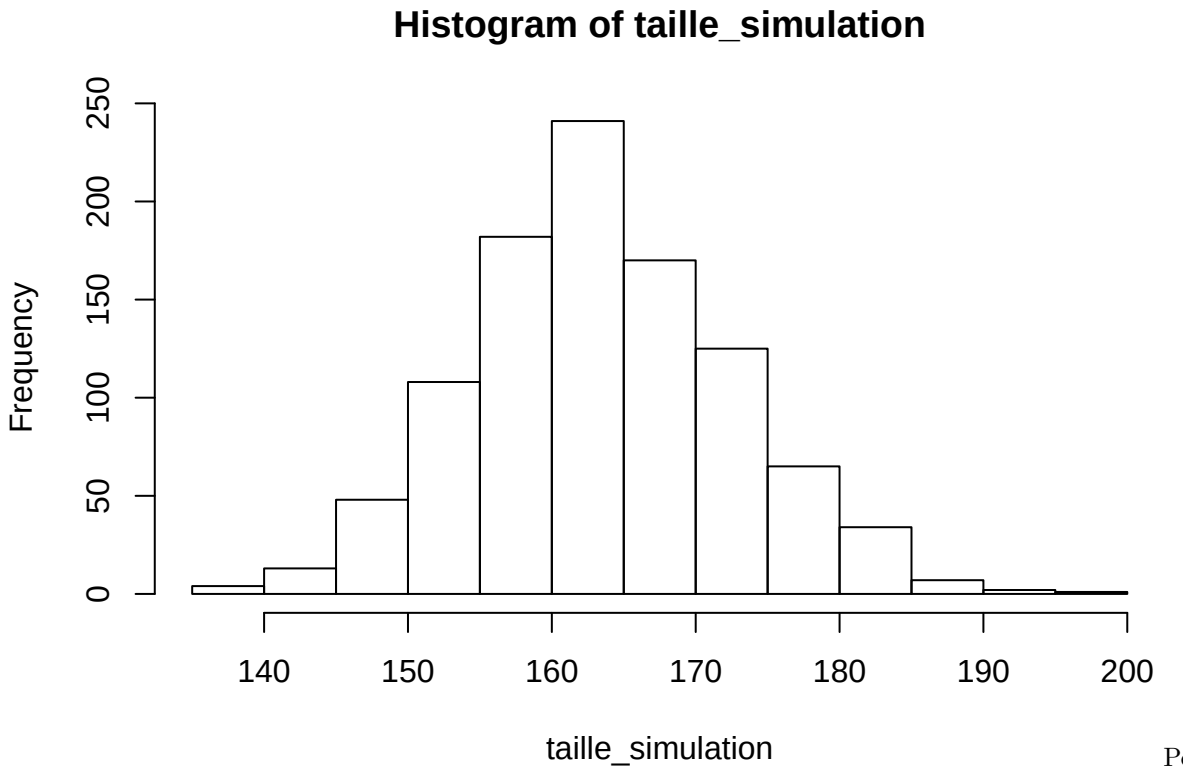
```
## [1] 1
```

```
n <-length(z)
N <- rnorm(n)
qqplot(z,N,xlim=c(-3,3),ylim=c(-3,3))
par(new=T)
plot(z,z,type="l",col="red",xlim=c(-3,3),ylim=c(-3,3))
```




Simulations

```
n <- 1000
simulation <- rnorm(n,mu_y,sigma_y)
taille_simulation <- exp(simulation)
hist(taille_simulation)
```




Poids

```
p <- log(nutriage$poids)
mu_p <- mean(p)
```

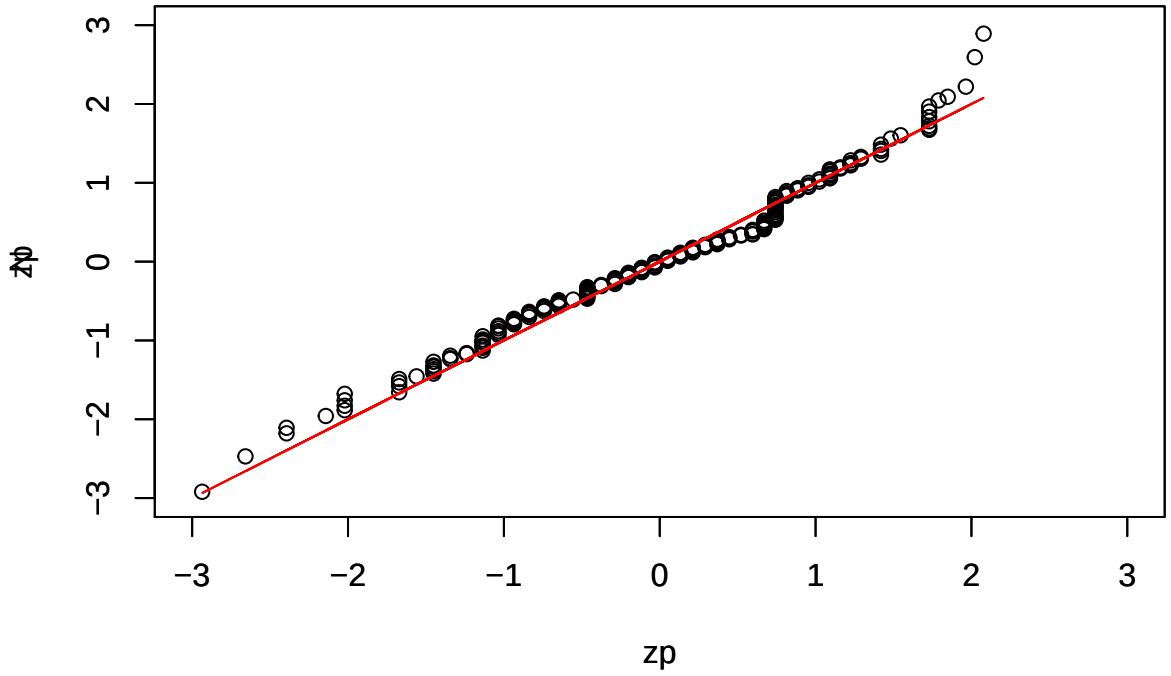
```
sigma_p <- sd(p)
mu_p
```

```
## [1] 4.180231
```

```
sigma_p
```

```
## [1] 0.1848361
```

```
zp <- (p -mu_p)/sigma_p
N <- rnorm(n)
qqplot(zp,N,xlim=c(-3,3),ylim=c(-3,3))
par(new=T)
plot(zp,zp,type="l",col="red",xlim=c(-3,3),ylim=c(-3,3))
```




```
taille_h <- nutriage$taille[nutriage$sexe==1]
taille_f <- nutriage$taille[nutriage$sexe==2]
mean(taille_h)
```

```
## [1] 172.5176
```

```
sd(taille_h)
```

```
## [1] 6.580295
```

```
mean(taille_f)
```

```
## [1] 158.8014
```

```
sd(taille_f)
```

```
## [1] 5.747322
```

```
length(taille_h)
```

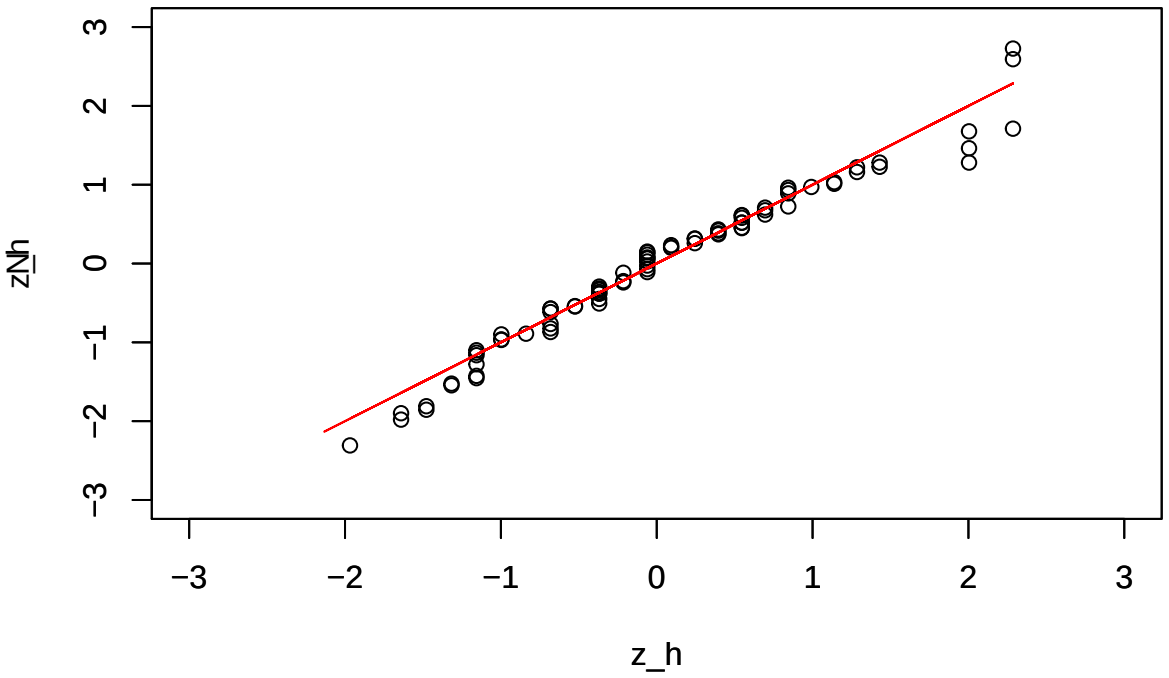
```
## [1] 85
```

```
length(taille_f)
```

```
## [1] 141
```

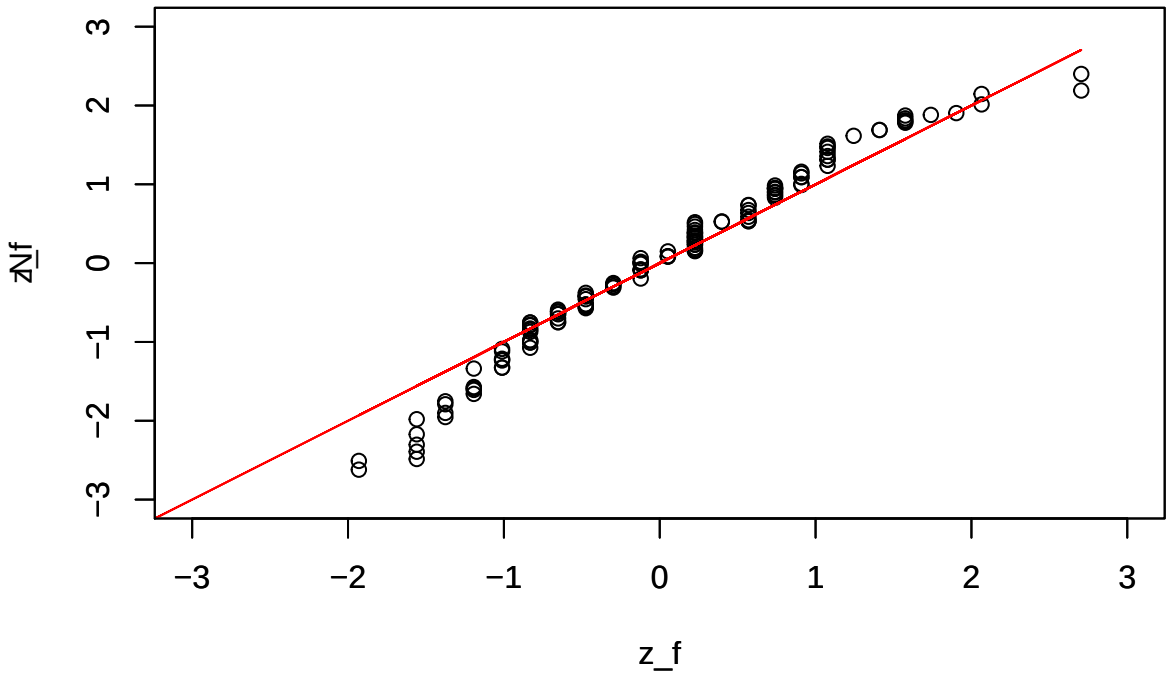
Normal chez les hommes

```
log_taille_h <- log(taille_h)
mu_logh <- mean(log_taille_h )
sigma_logh <- sd(log_taille_h )
z_h <- (log_taille_h-mu_logh)/sigma_logh
N <- rnorm(length(taille_h))
qqplot(z_h,N,xlim=c(-3,3),ylim=c(-3,3))
par(new=T)
plot(z_h,z_h,type="l",col="red",xlim=c(-3,3),ylim=c(-3,3))
```




Normal cchez les femmes

```
log_taille_f <- log(taille_f)
mu_logf <- mean(log_taille_f )
sigma_logf <- sd(log_taille_f )
z_f <- (log_taille_f-mu_logf)/sigma_logf
N <- rnorm(length(taille_f))
qqplot(z_f,N,xlim=c(-3,3),ylim=c(-3,3))
par(new=T)
plot(z_f,z_f,type="l",col="red",xlim=c(-3,3),ylim=c(-3,3))
```




```
mean(nutriage$cafe)
```

```
## [1] 1.619469
```

```
var(nutriage$cafe)
```

```
## [1] 1.570108
```

```
lambda <- (mean(nutriage$cafe)+var(nutriage$cafe))/2
lambda
```

```
## [1] 1.594789
```

```
simulation_p <- rpois(1000,lambda)
boxplot(simulation_p)
```