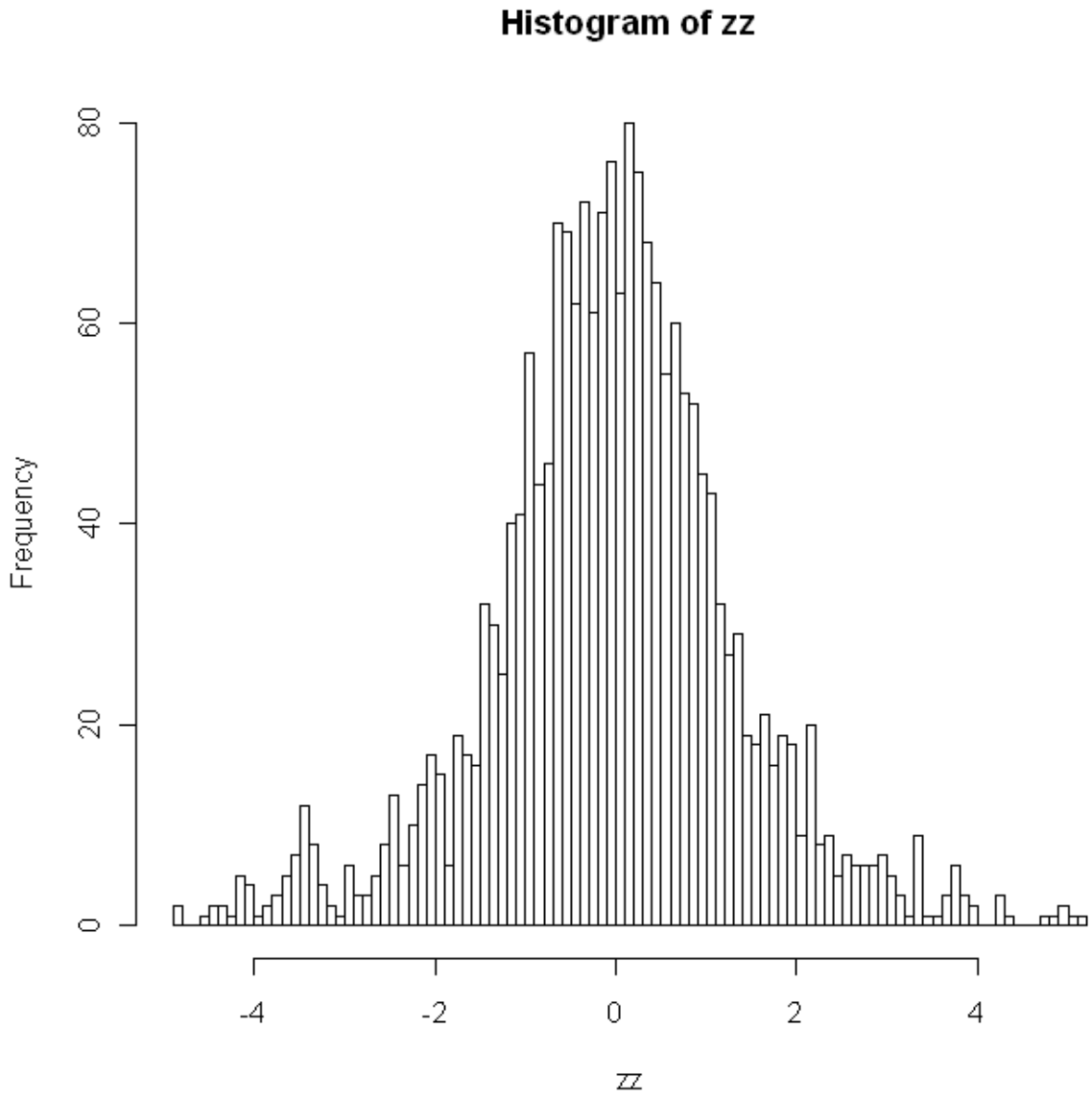
Package *locfdr2* Demo

Simulate a vector of null and non-null z-values as a normal mixture:

```
>  zz <- c(rnorm(1800), rnorm(100, mean = -3), rnorm(100, mean = 3))
```

See how the distribution of z-values looks like:

```
> hist(zz, breaks = 120)
```



By default, empirical null is estimated via MLE. When mult.pct0 is not specified, locfdr and locfdr2 produce the same empirical null (Figure 1):

```
> result <- locfdr(zz)

> result2 <- locfdr2(zz)
```

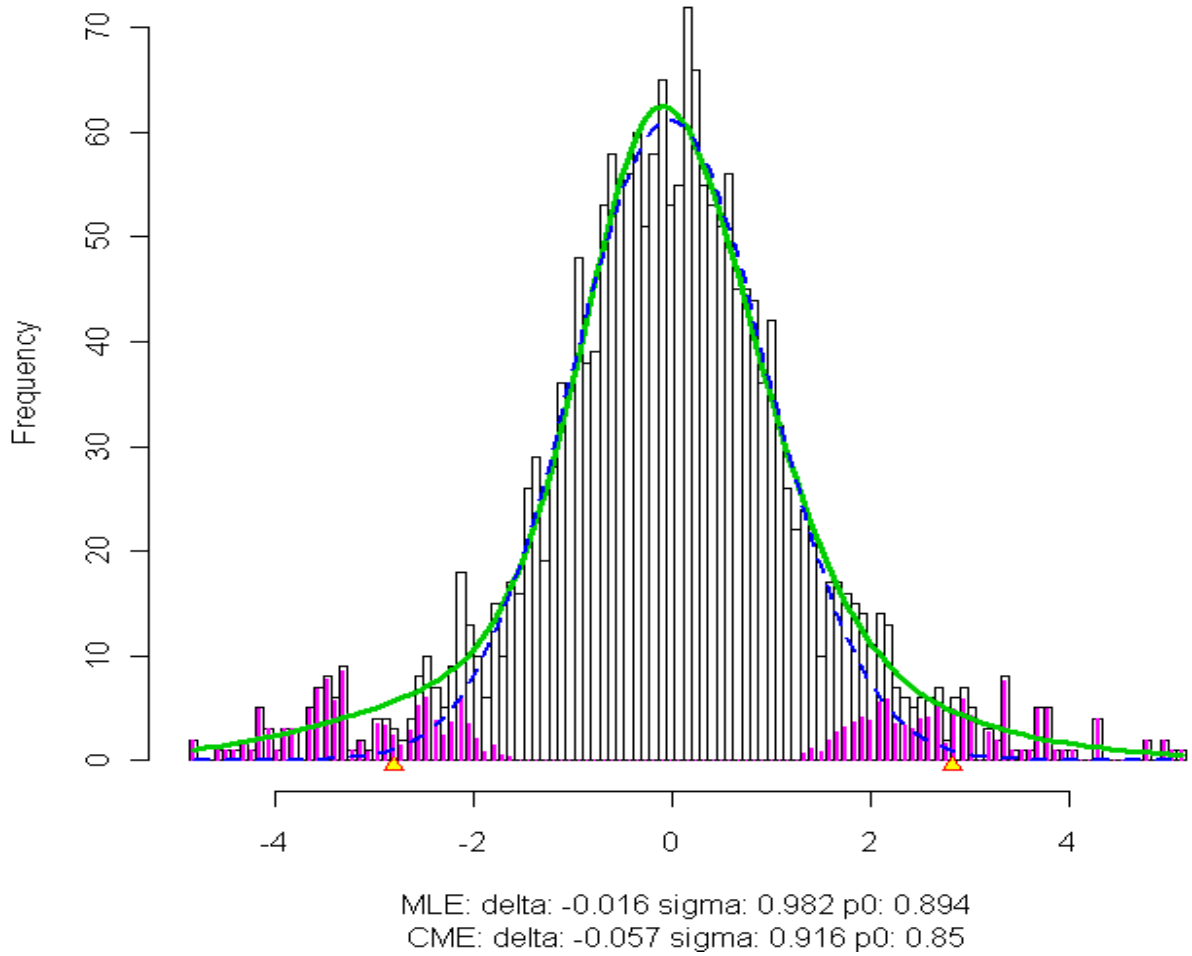


Figure1

If we specify mle.pct0, the result will be different (Figure 2). Let's specify zero interval as the interval between 0.25 and 0.75 quantiles of z-values:

```
> result2 <- locfdr2(zz, mle.pct0 = c(0.25, 0.75))
```

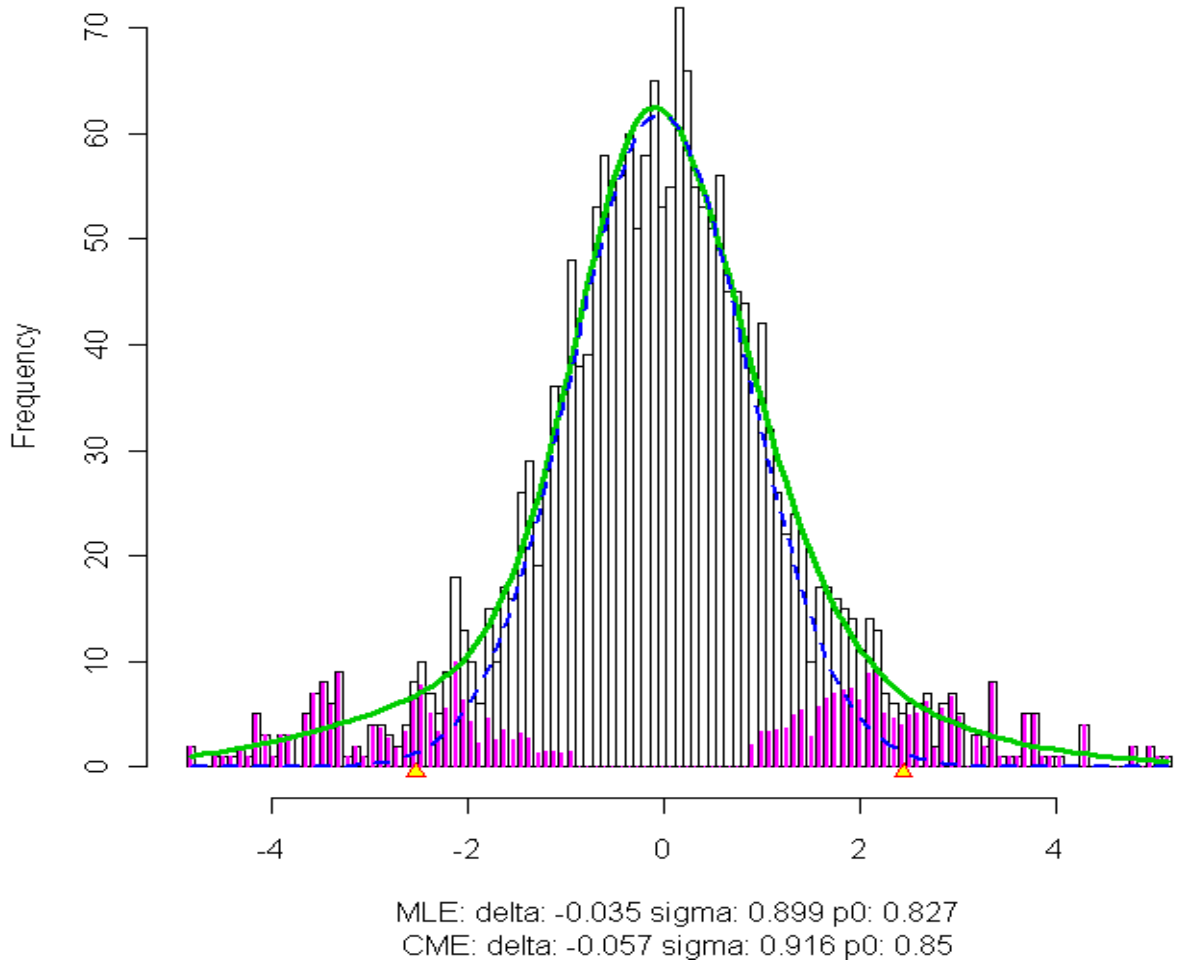


Figure 2

Now let's specify Fdr thresholds as 0.12 on the left, 0.15 on the right. And see what we get for the samples that are 1.5, 2, and 2.5 times as large as the original:

```
> result2 <- locfdr2(zz, mle.pct0 = c(0.25, 0.75), mult.cut = c(0.12, 0.15), mult = c(1.5, 2, 2.5))
```

The locfdr power statistics "mult" and "Efdr" are the same for locfdr2:

```
> result2$mult
      1      1.5        2      2.5
1.0000000 0.7139242 0.5526137 0.4496965
>  result2$Efdr
    Efdr     Eleft    Eright  Efdrtheo    Eleft0   Eright0
0.3141080 0.2788159 0.3455025 0.2638539 0.2272984 0.3048331
```

The new, more detailed power statistics implemented in locfdr2 are:

```
> result2$mult2
  Multiple  EfdrFull  EfdrLeft EfdrRight FdrThreshLeft FdrThreshRight  PropLeft PropRight
1      1.0 0.3141080 0.2788159 0.3455025     0.1187201      0.1631167 0.7075569 0.5887385
2      1.5 0.2242493 0.1981183 0.2461345     0.1058082      0.1579711 0.8320212 0.7719459
3      2.0 0.1735804 0.1569609 0.1864935     0.1035747      0.1694126 0.8882159 0.8757883
4      2.5 0.1412533 0.1324935 0.1475379     0.1047725      0.1589712 0.9178405 0.9189669
```

The interpretation is as follows: suppose the sample gets two times as large. Then Efdr decreases from 0.3141080 to 0.1735804, EfdrLeft decreases from 0.2788159 to 0.1569609.

If we declare that all cases in the right tail with FdrRight < 0.1694126 are "non-null", we will capture 87.57% of the non-null cases in the right tail. The cutoff is different from 0.15 because of discrete scale. For the original sample it's about the same, 0.1631167, but we are only able to identify 58.87% of non-null cases in the right tail. For the left tail, the interpretation is similar.