

Recommended Exercise 4 in Statistical Linear Models, Spring 2021

alexaoh

18 februar, 2021

Problem 4 T- and F-distributions in R

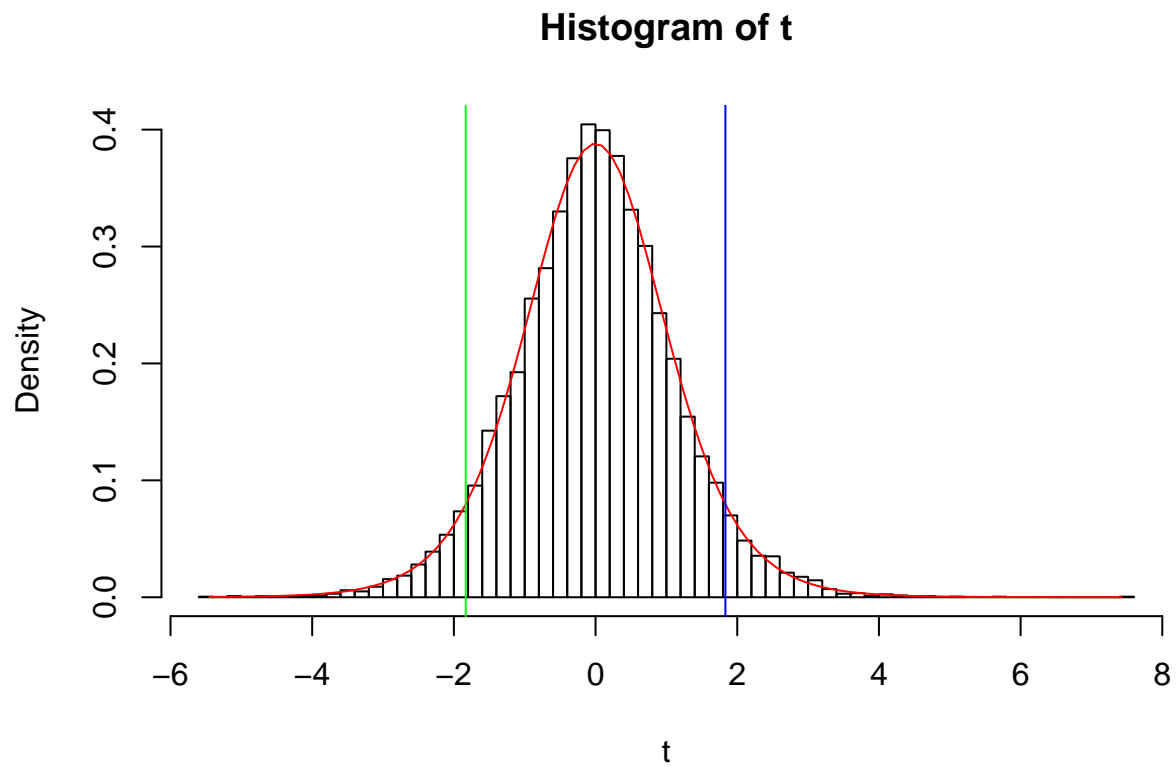
a)

```
B <- 10000
p <- 9

sample.norm <- rnorm(B)
sample.chi <- rchisq(B, df = p)

t <- sample.norm/sqrt(sample.chi/p)

hist(t, freq = F, nclass = 50)
plot(function(x) dt(x, df = p), from = min(t), to = max(t),
      add = TRUE, col = "red")
abline(v = c(qt(0.05, df = p), qt(0.95, df = p)), col = c("green", "blue"))
```

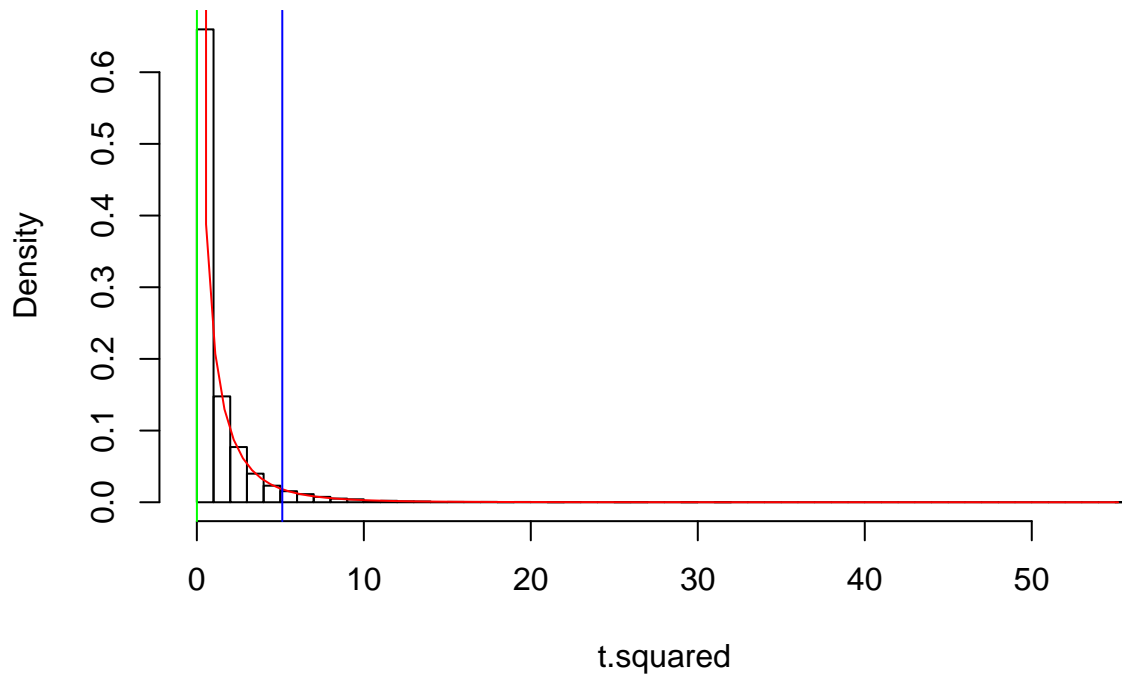


b)

```
t.squared <- (sample.norm/sqrt(sample.chi/p))^2

hist(t.squared, freq = F, nclass = 50)
plot(function(x) df(x, df1 = 1, df2 = p), from = min(t.squared), to = max(t.squared),
      add = TRUE, col = "red")
abline(v = c(qf(0.05, df1 = 1, df2 = p), qf(0.95, df1 = 1, df2 = p)), col = c("green", "blue"))
```

Histogram of t.squared



c)

```
n1 <- 5
n2 <- 40

sample.chin1 <- rchisq(B, df = n1)
sample.chin2 <- rchisq(B, df = n2)

F.ratio <- (sample.chin1/n1)/(sample.chin2/n2)

hist(F.ratio, freq = F, nclass = 50)
plot(function(x) df(x, df1 = n1, df2 = n2), from = min(F.ratio), to = max(F.ratio),
      add = TRUE, col = "red")
abline(v = c(qf(0.05, df1 = n1, df2 = n2), qf(0.95, df1 = n1, df2 = n2)), col = c("green", "blue"))
```

Histogram of F.ratio

