Student’s t-distribution

dt(x, df)

pt(q, df, lower.tail = TRUE)

qt(p, df, lower.tail = TRUE)

rt(n, df, ncp)

Parameters:

- x is the quantiles vector
- q is the quantiles vector
- p is the vector of probabilities
- **n:** Number of observations
- df is the degrees of freedom
- lower.tail – if TRUE (default), probabilities are P[X ≤ x], otherwise, P[X > x].
- df is the degrees of freedom

Student’s t-distribution

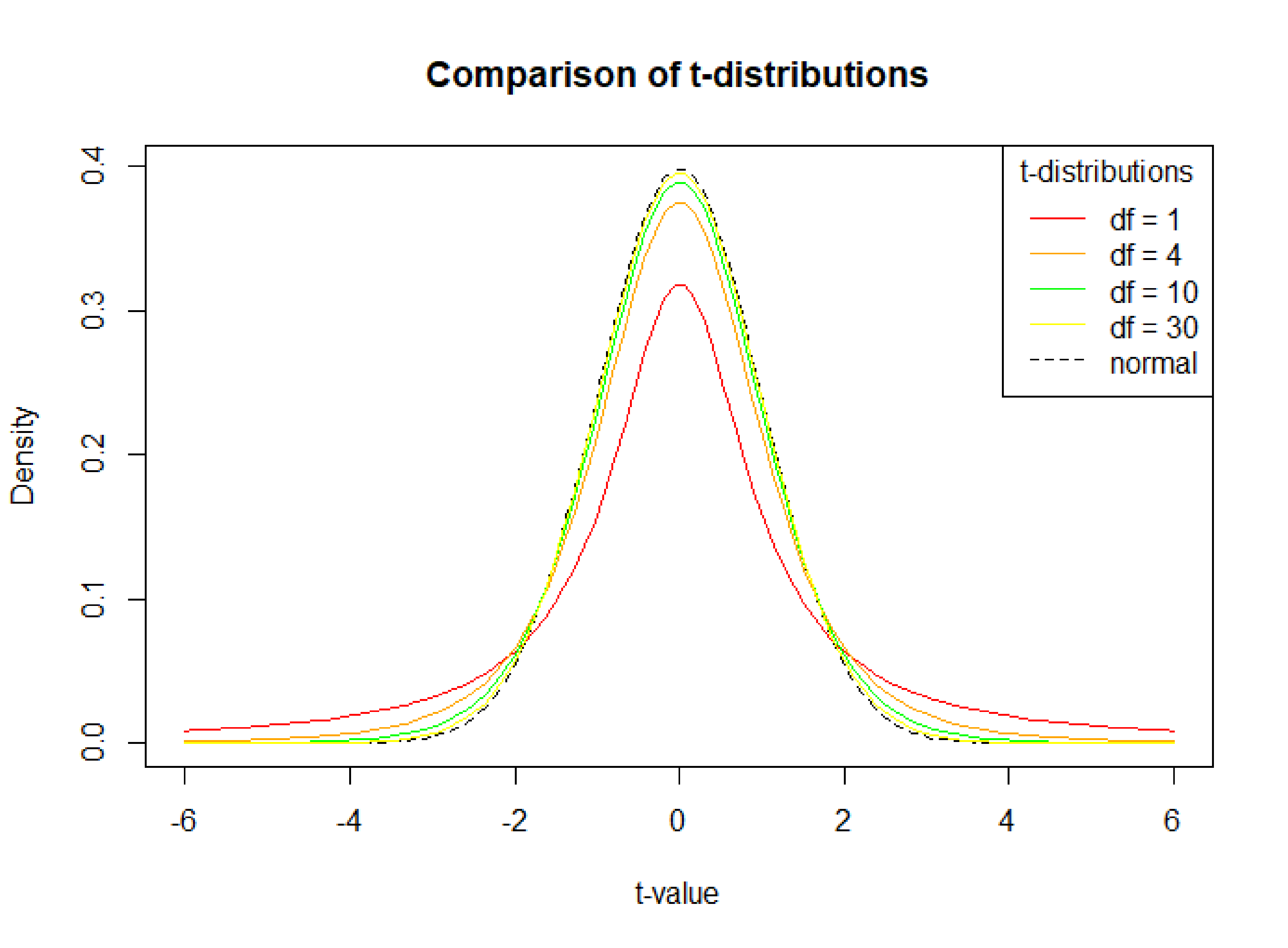
```
# Generate a vector of 100 values between -6 and 6
x <- seq(-6, 6, length = 100)

# Degrees of freedom
df = c(1,4,10,30)
colour = c("red", "orange", "green", "yellow","black")

# Plot a normal distribution
plot(x, dnorm(x), type = "l", lty = 2, xlab = "t-value", ylab =
"Density",  main = "Comparison of t-distributions", col = "black")

# Add the t-distributions to the plot
for (i in 1:4)
        { lines(x, dt(x, df[i]), col = colour[i]) }

# Add a legend
legend("topright", c("df = 1", "df = 4", "df = 10", "df = 30",
"normal"),  col = colour, title = "t-distributions", lty = c(1,1,1,1,2))
```


Comparison of t-distributions
Density
0.0
0.1
0.2
0.3
0.4
t-value
-6
-4
-2
0
2
4
6
t-distributions
df = 1
df = 4
df = 10
df = 30
normal

F -Distribution

df(x, df1, df2, ncp, log = FALSE)

pf(q, df1, df2, ncp, lower.tail =TRUE, log.p = FALSE)

qf(p, df1, df2, ncp, lower.tail =TRUE, log.p = FALSE)

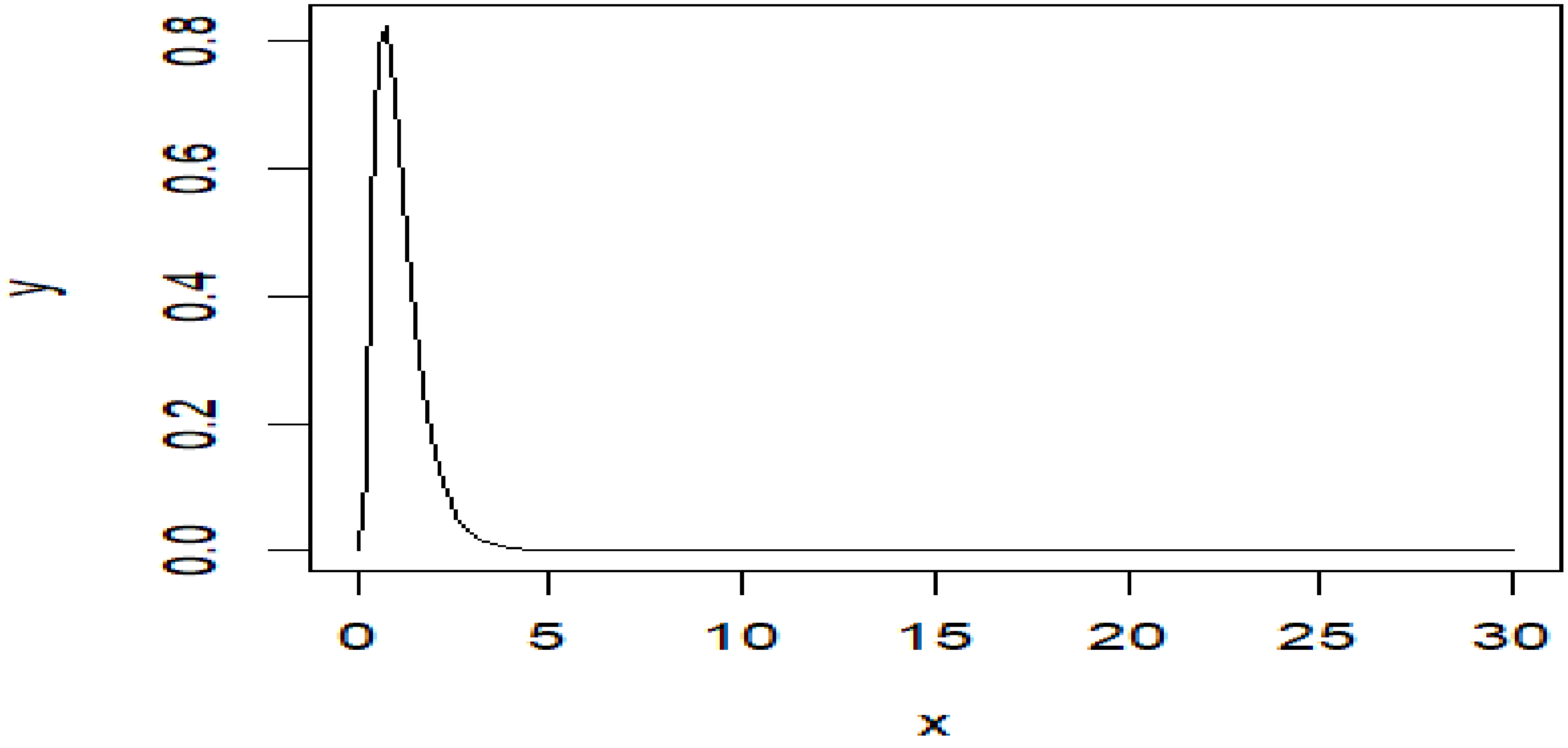
rf(n, df1, df2, ncp)

F -Distribution

```
x <- seq(0, 30, by = 0.2)
```

```
y <- df(x, df1 = 10, df2 = 20)
```

```
plot(x, y)
```


y
0.0
0.2
0.4
0.6
0.8
0
5
10
15
20
25
30
x

Chi-square distribution function

```
library(ggplot2)
x <- seq(0, 50, 0.1)
y1 <- dchisq(x, df = 4)
y2 <- dchisq(x, df = 8)
y3 <- dchisq(x, df = 16)
```

Chi-square distribution function

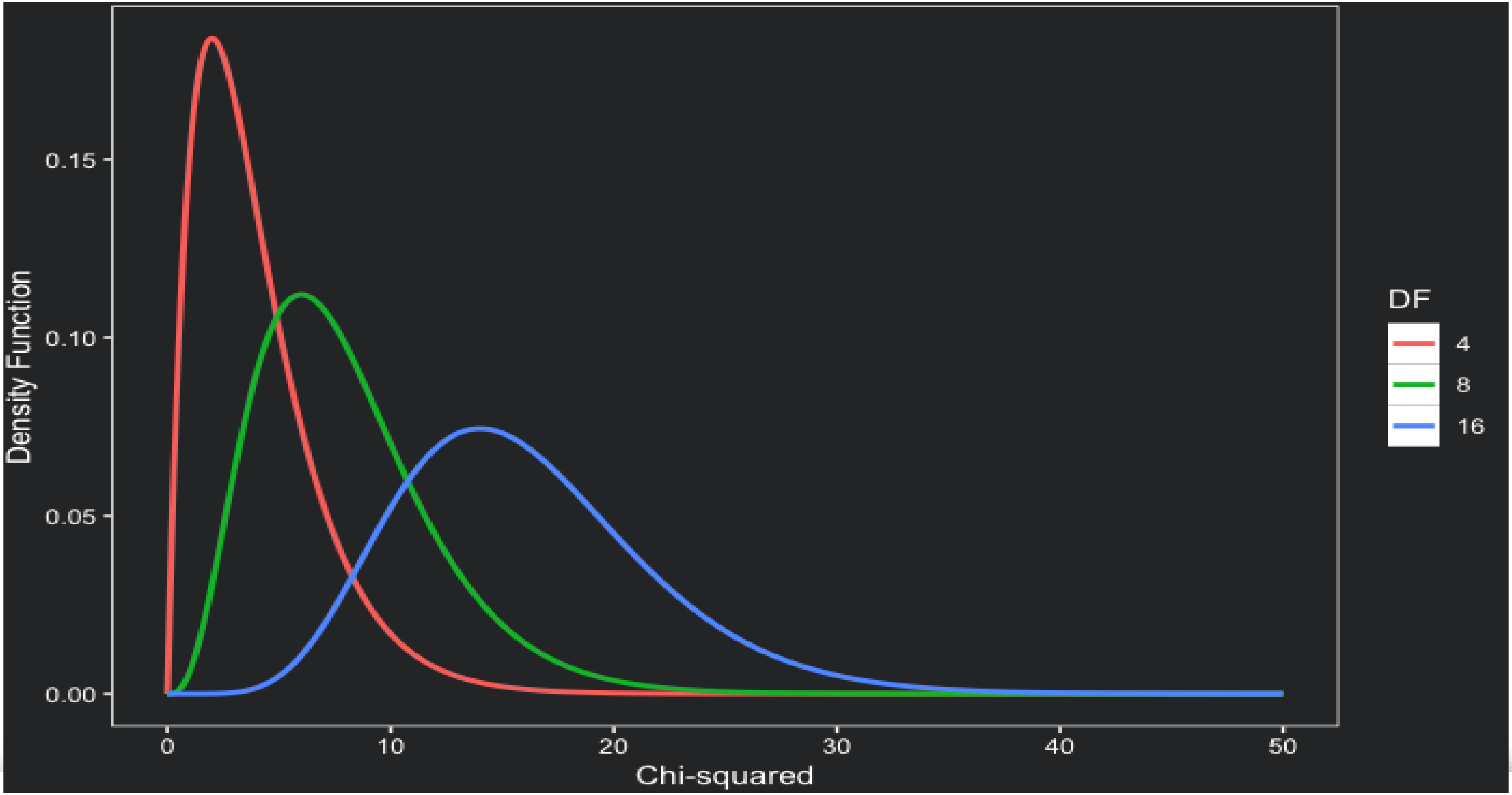
```
df1 <- data.frame(x = x, y = y1, df = 4)
df2 <- data.frame(x = x, y = y2, df = 8)
df3 <- data.frame(x = x, y = y3, df = 16)
df <- rbind(df1, df2, df3)
```

Chi-square distribution function

```
ggplot(data=df, aes(x = x, y = y, color = as.factor(df)))+
```

```
geom_line(linewidth=1)+ scale_color_discrete(name = "DF")+
labs(y = “Probability Density Function", x = "Chi-square")+
```

```
theme_coding_the_past()
```



Chi-square distribution function