Statistica - Introduzione a 

a cura di Antonio Iovanella

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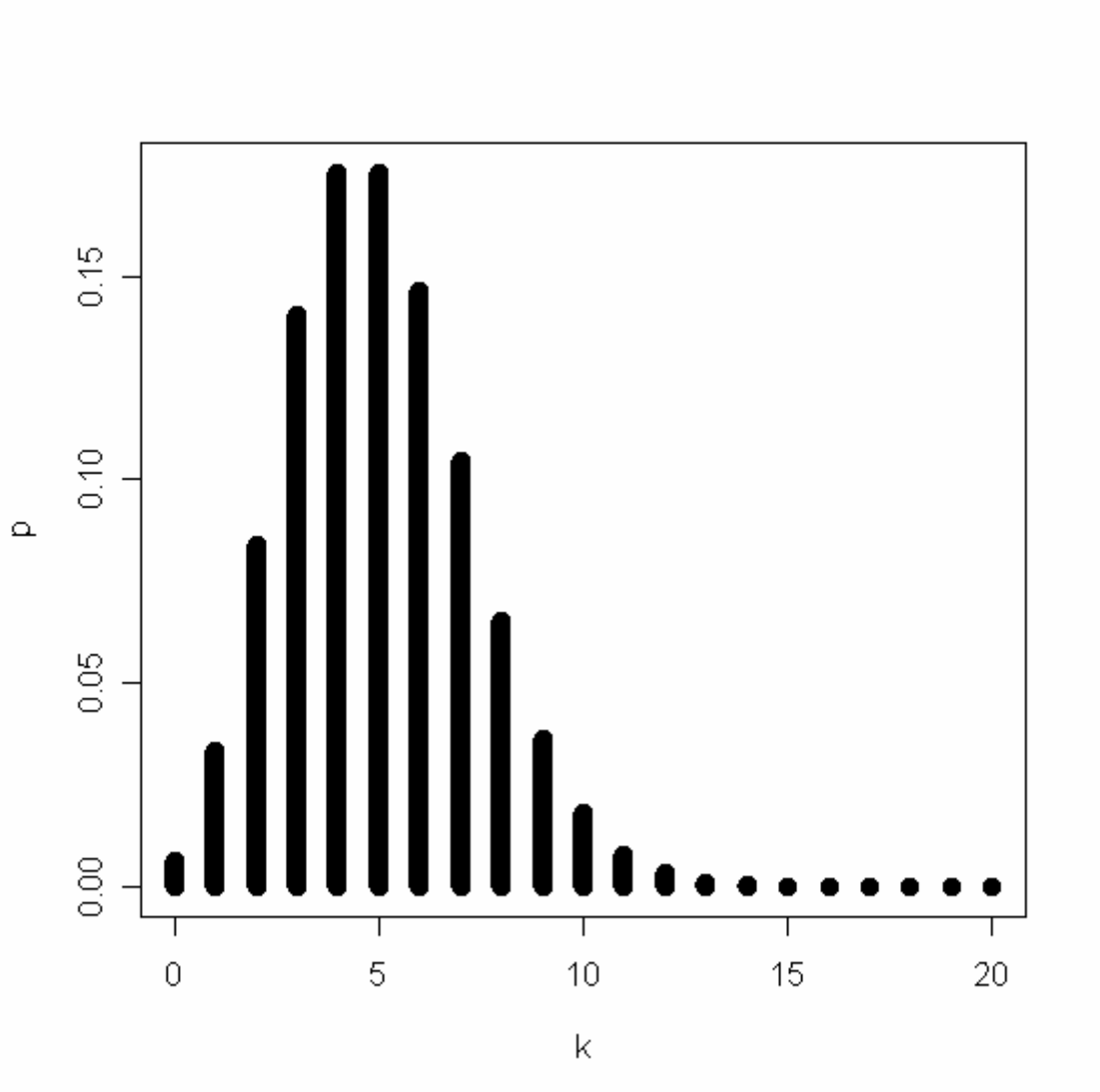
Esempi di distribuzioni di probabilità con R

Distribuzione di Poisson

```
##POISSON

k <- 0:20
p <- dpois(k, lambda = 5)
plot(k, p, type = "h", lwd = 10)
```

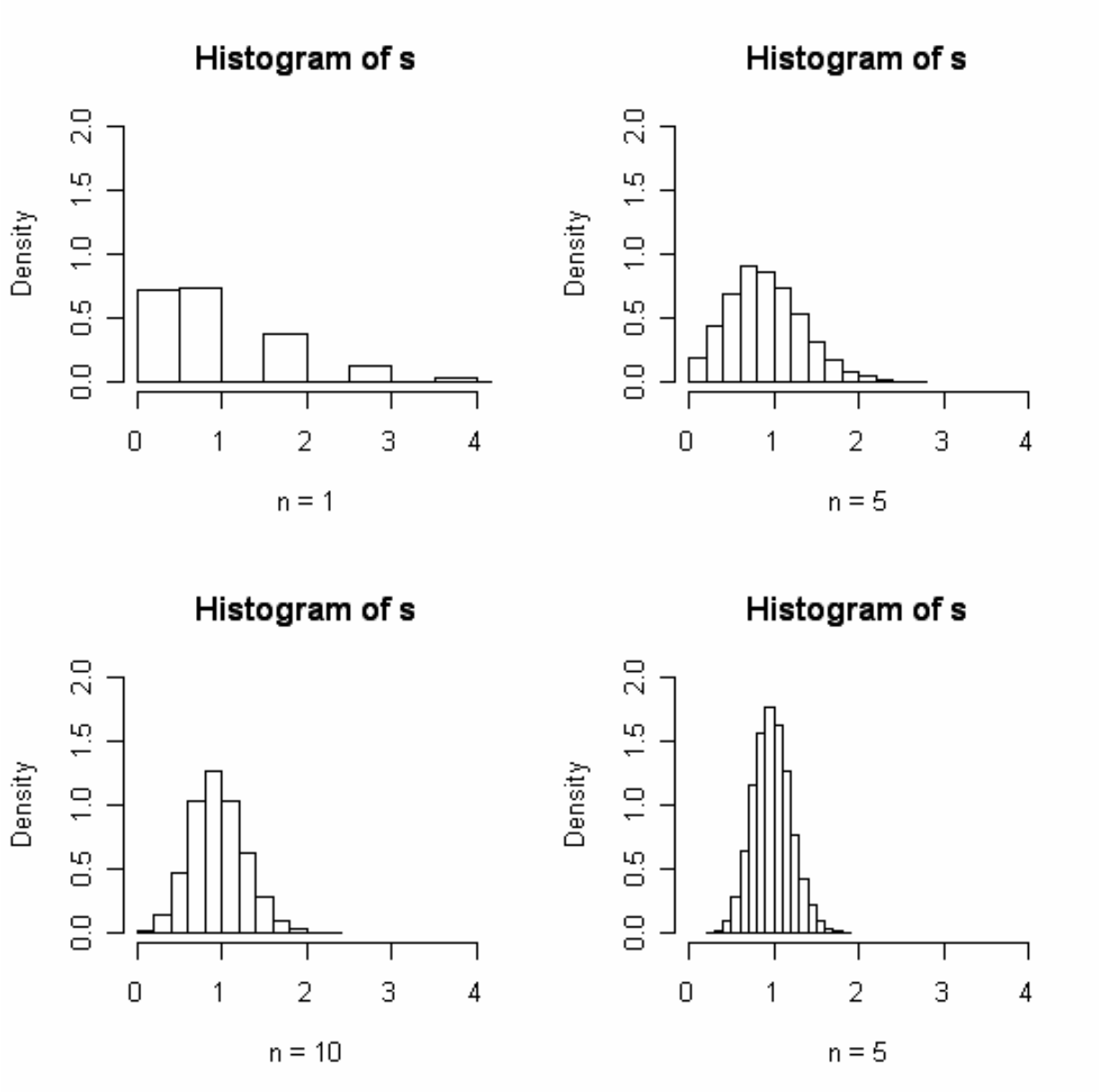
Distribuzione di Poisson



Distribuzione di Poisson

```
##REALIZZAZIONI DI POISSONIANE

s<-c()

for (i in 1:10000) s[i]<-mean(rpois(n=1,1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rpois(n=5,1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rpois(n=10,1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rpois(n=20,1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))
```

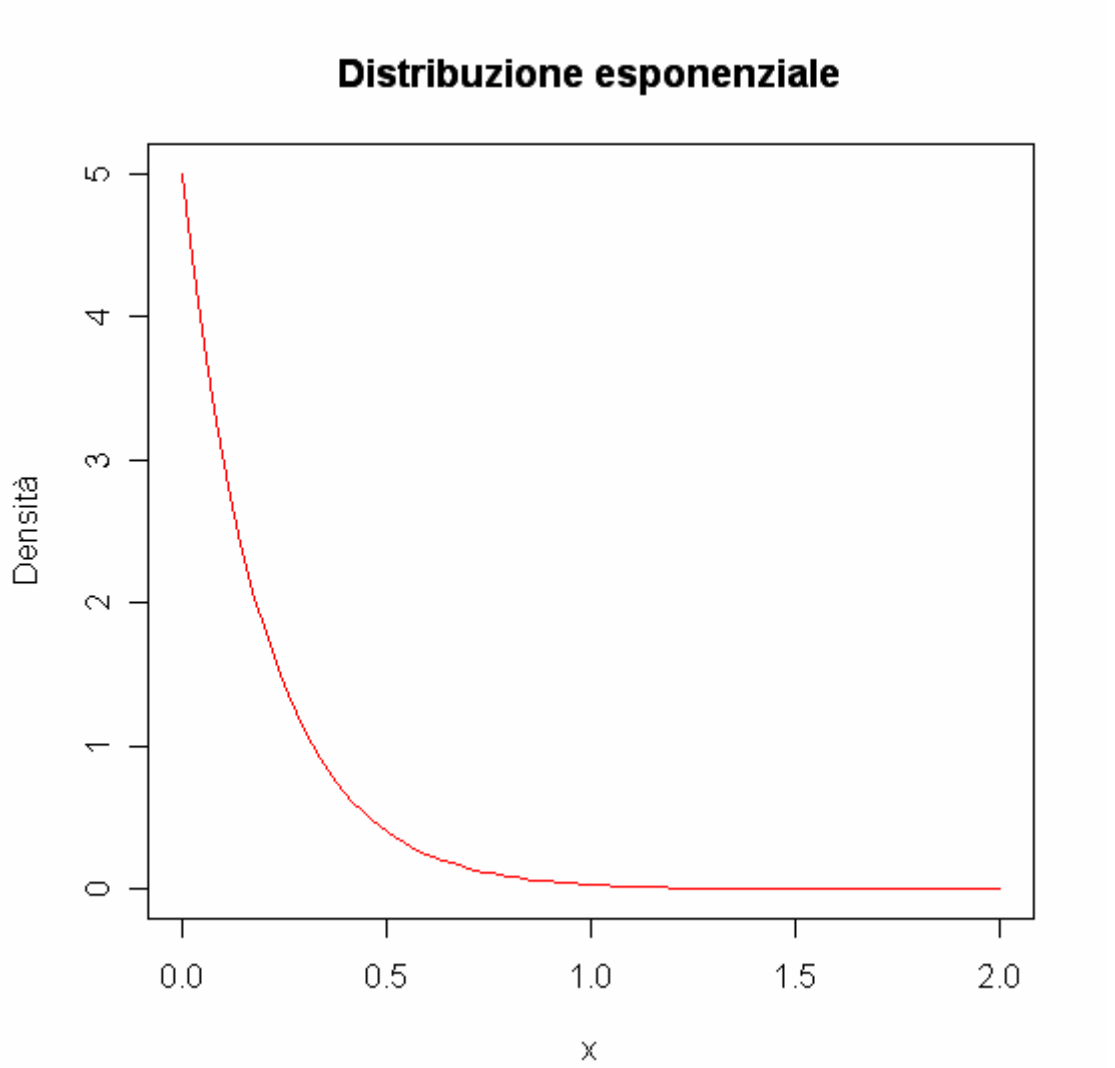
Distribuzione di Poisson



Distribuzione Esponenziale

```
##ESPONENZIALE

curve(dexp(x, rate = 5), col="red", ylab = "Densità",
from = 0, to = 2, main = "Distribuzione esponenziale")
```

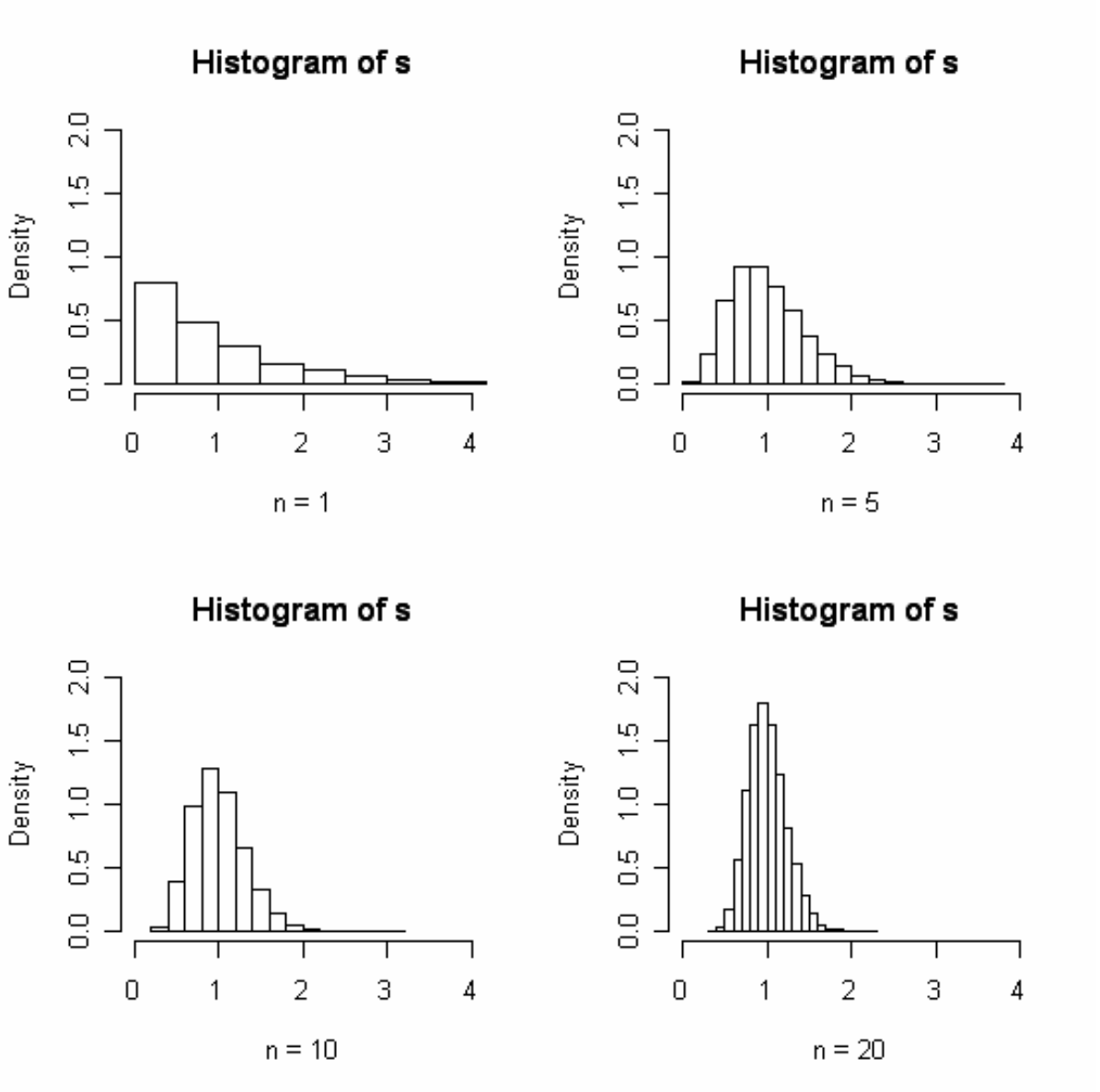
Distribuzione Esponenziale



Distribuzione Esponenziale

```
##REALIZZAZIONE DI ESPONENZIALI

s<-c()

for (i in 1:10000) s[i]<-mean(rexp(n=1,rate=1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rexp(n=5,rate=1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rexp(n=10,rate=1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rexp(n=20,rate=1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))
```

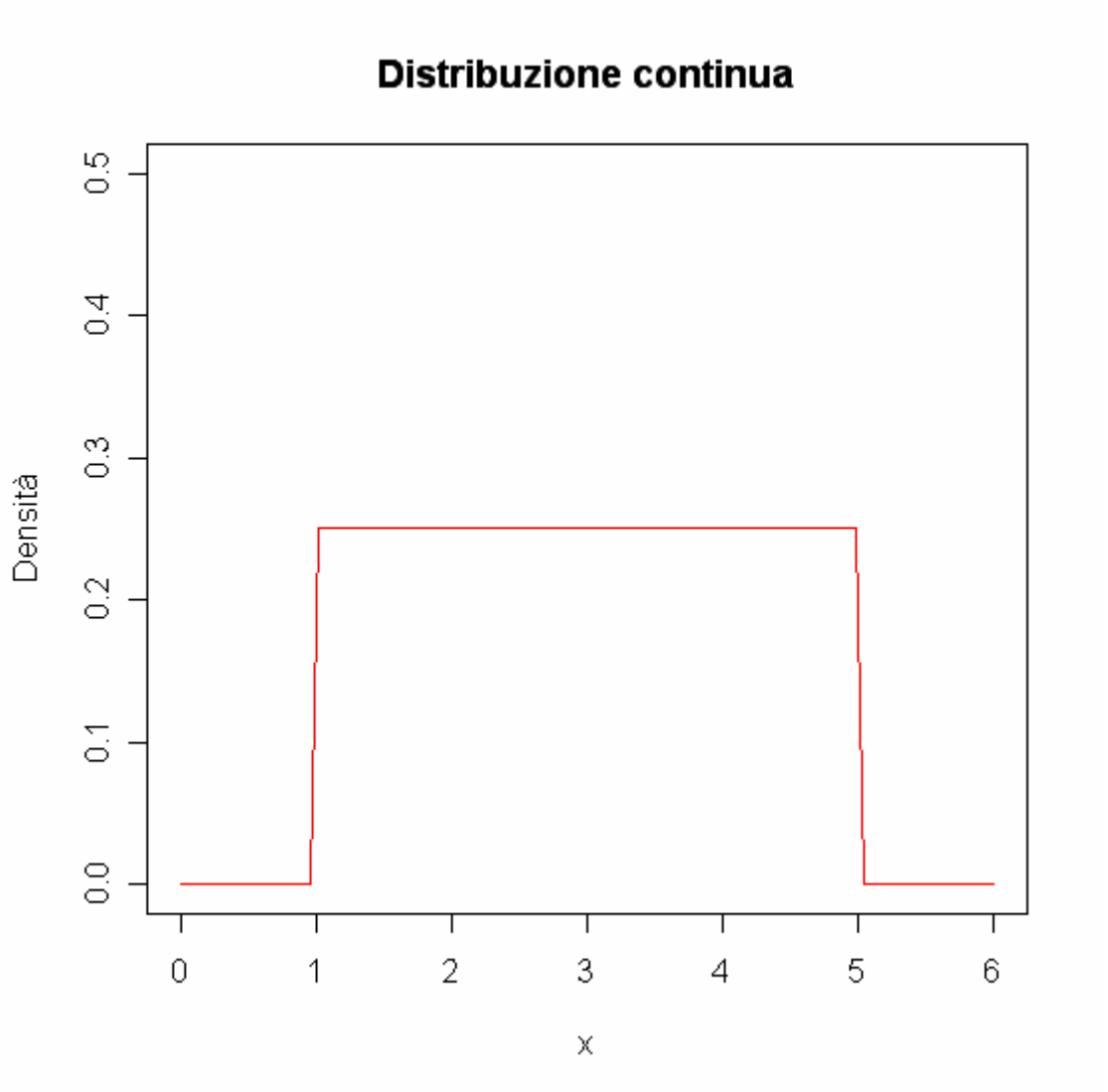
Distribuzione Esponenziale



Distribuzione Continua

```
##CONTINUA

curve(dunif(x, min = 1, max = 5), col="red", from = 0,
to = 6, ylab = "Densità", ylim = c(0,0.5), main =
"Distribuzione continua")
```

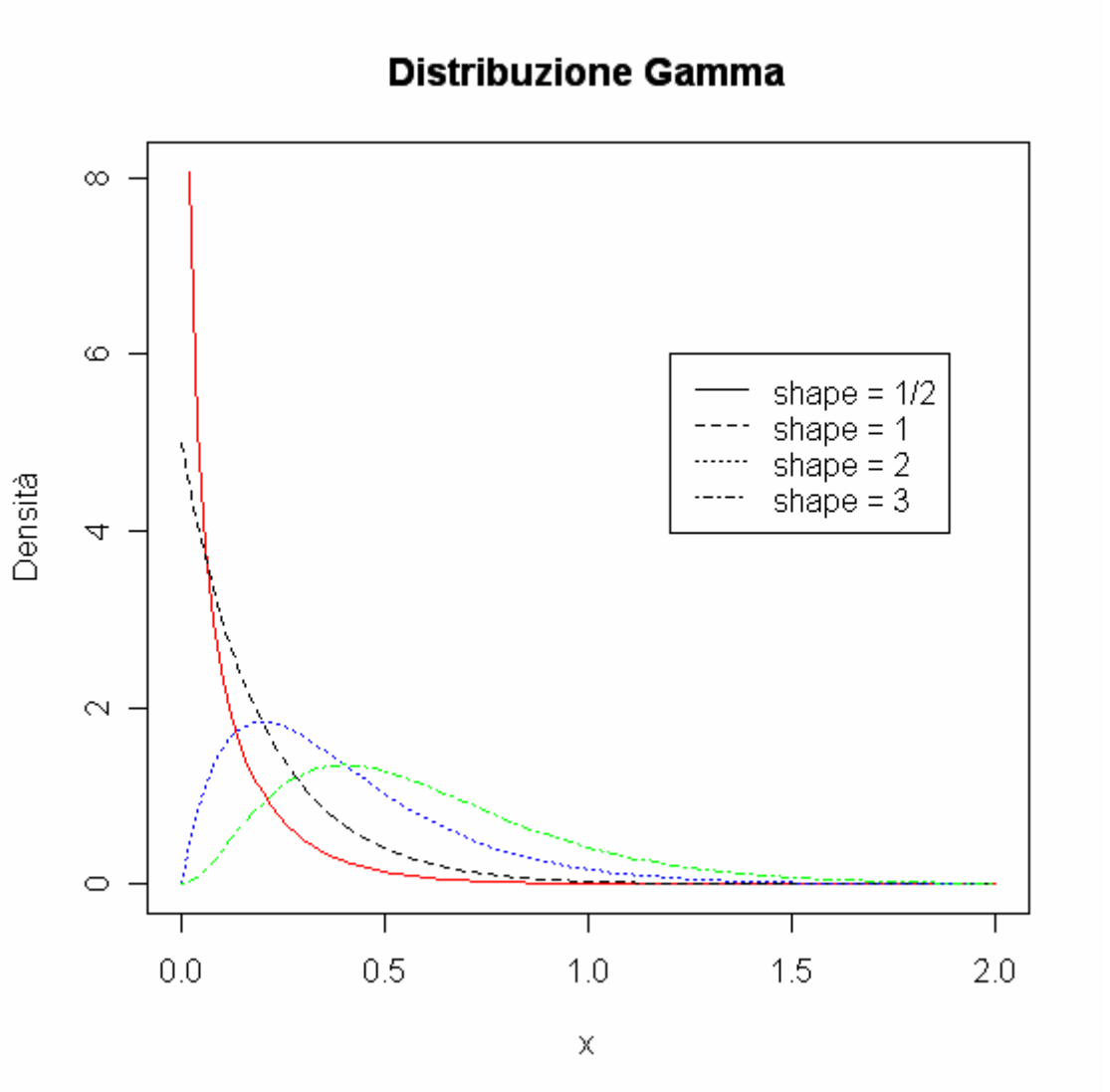
Distribuzione Continua



Distribuzione Gamma

```
##GAMMA

curve(dgamma(x, shape = 0.5, rate = 5), col = "red",
ylab = "Densità", from = 0, to = 2, main =
"Distribuzione Gamma")

curve(dgamma(x, shape = 1, rate = 5), from = 0, to = 2,
add = T, lty = 2)

curve(dgamma(x, shape = 2, rate = 5), col = "blue",
from = 0, to = 2, add = T, lty = 3)

curve(dgamma(x, shape = 3, rate = 5), col = "green",
from = 0, to = 2, add = T, lty = 4)

legend(1.2,6, c("shape = 1/2", "shape = 1", "shape =
2", "shape = 3"), lty = c(1, 2, 3, 4))
```

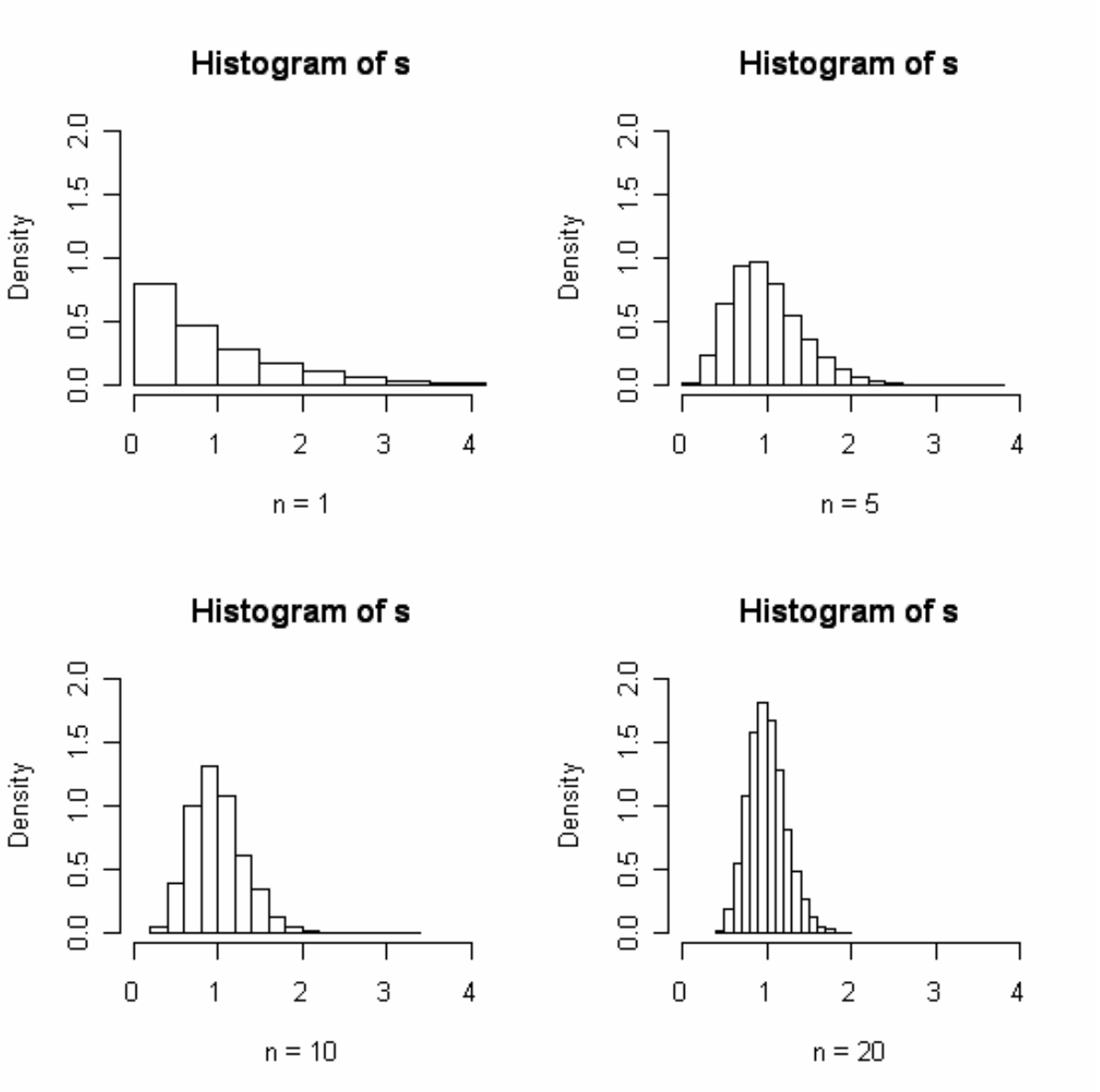
Distribuzione Gamma



Distribuzione Gamma

```
##REALIZZAZIONI DI GAMMA

s<-c()

for (i in 1:10000) s[i]<-mean(rgamma(n=1,1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rgamma(n=5,1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rgamma(n=10,1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rgamma(n=20,1))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))
```

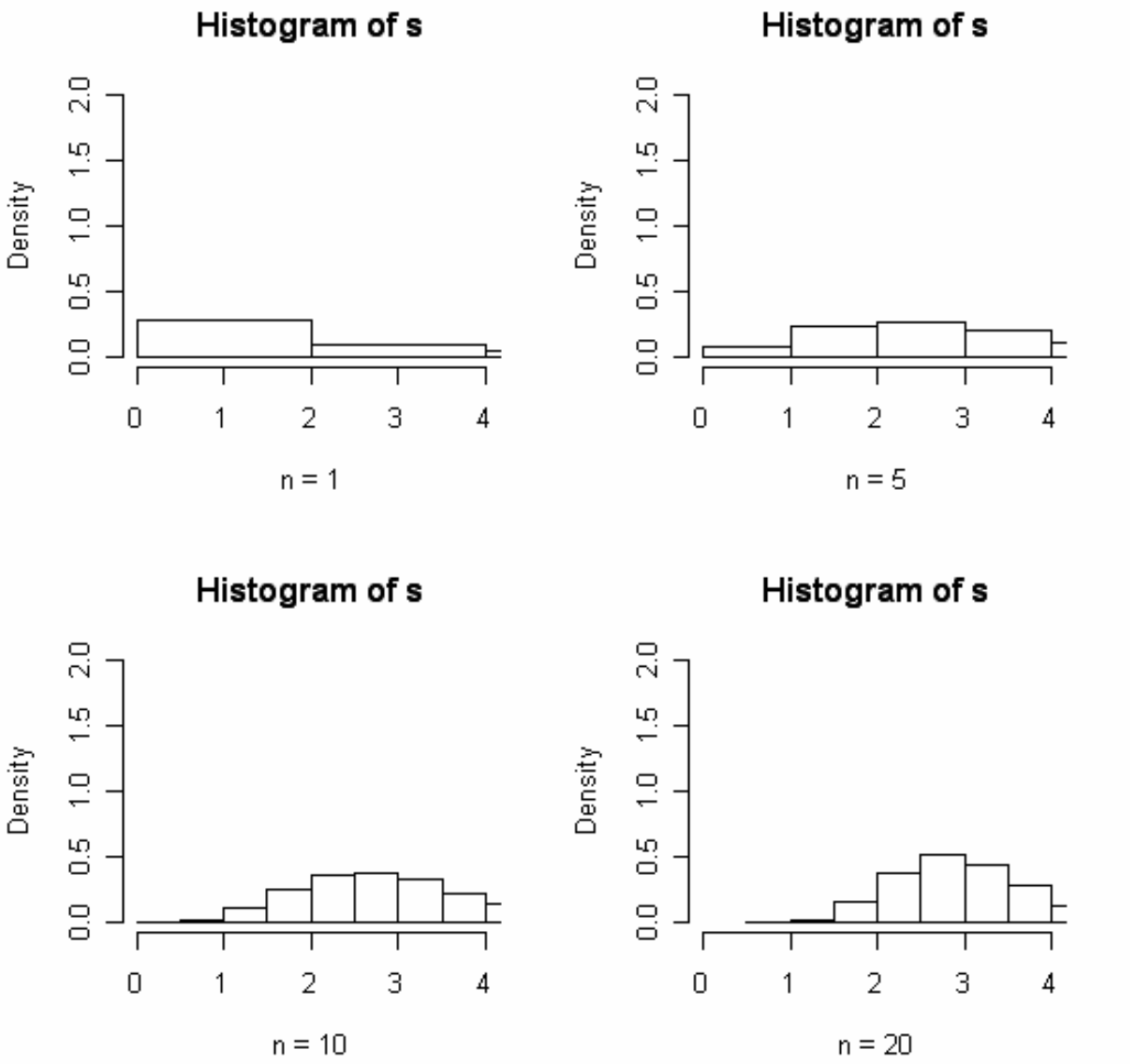
Distribuzione Gamma



Distribuzione Geometrica

```
##REALIZZAZIONI DI GEOMETRICA

s<-c()

for (i in 1:10000) s[i]<-mean(rgeom(n=1,prob = 1/4))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rgeom(n=5,prob = 1/4))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rgeom(n=10,prob = 1/4))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))

for (i in 1:10000) s[i]<-mean(rgeom(n=20,prob = 1/4))
hist(s,prob=T,xlim=c(0,4),ylim=c(0,2))
```

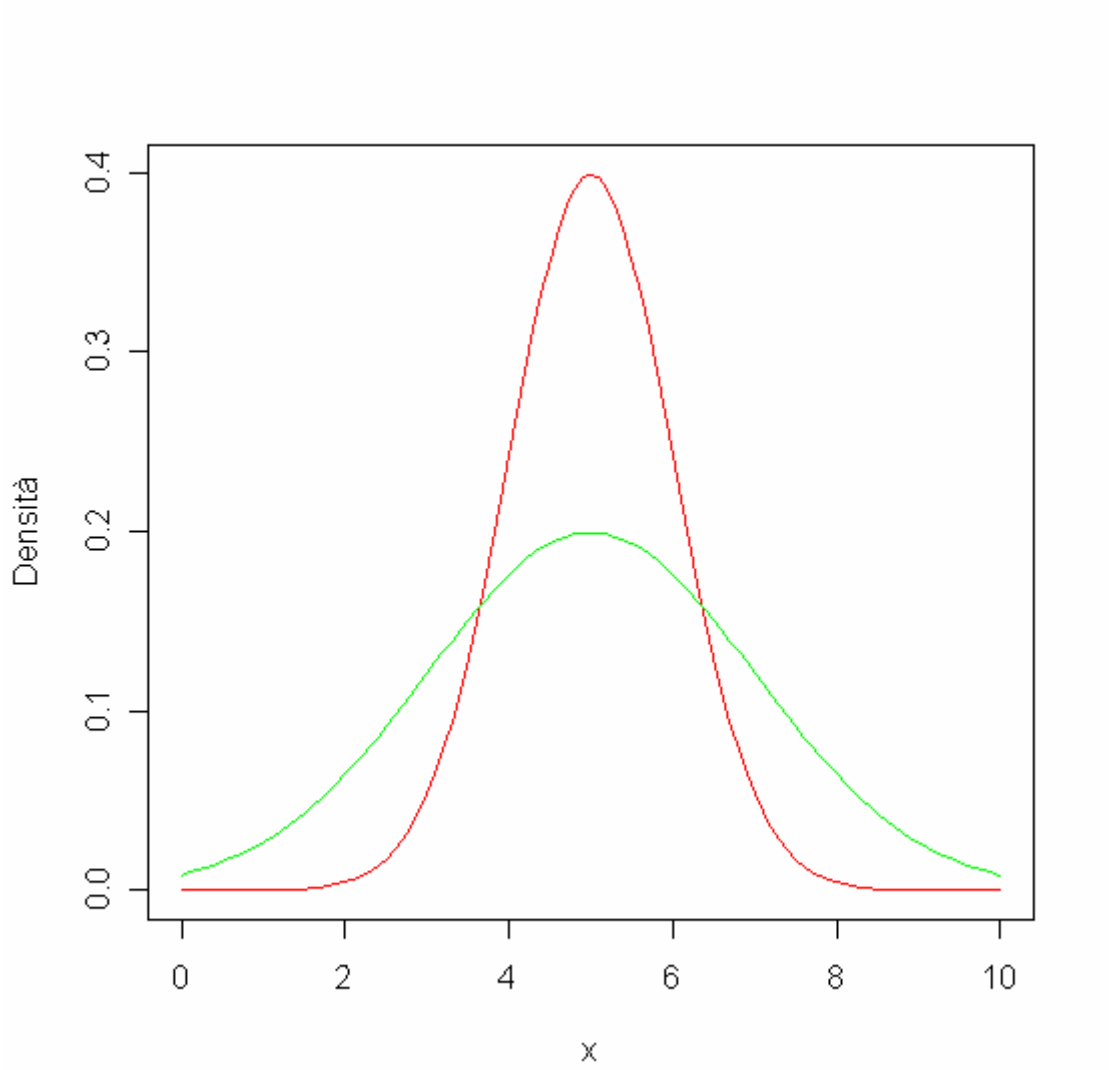
Distribuzione Geometrica



Distribuzione Normale

```
##NORMALE (o GAUSSIANA)

curve(dnorm(x, mean = 5), from = 0, to = 10,
col="blue", ylab = "Densità",  main = "Distribuzione
Gaussiana")

curve(dnorm(x, mean = 5, sd = 1), from = 0, to = 10,
col="red", ylab = "Densità“)

curve(dnorm(x, mean = 5, sd = 2), from = 0, to = 10,
col="green", add = T)
```

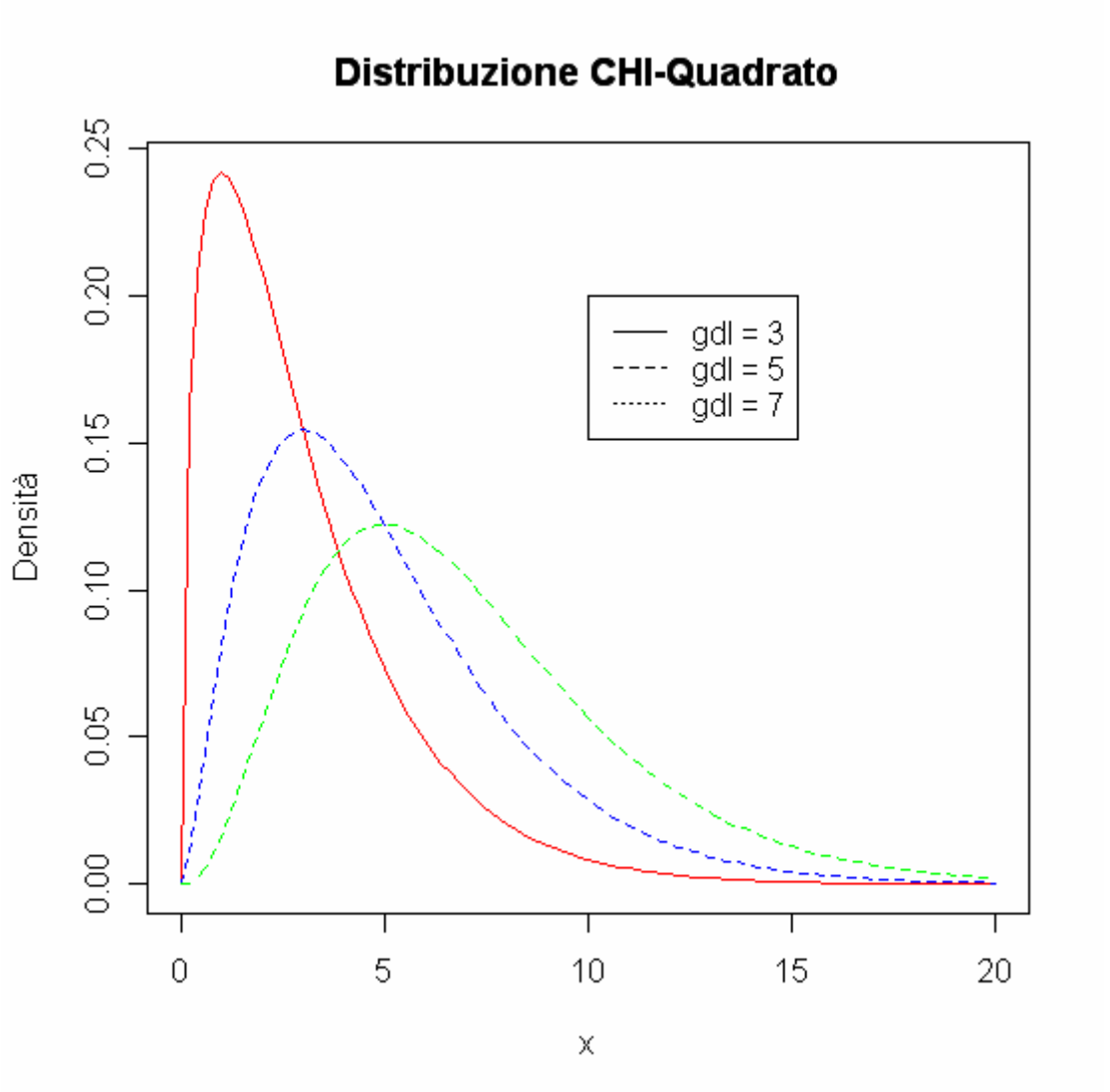
Distribuzione Normale



Distribuzione Chi-Quadrato

```
##CHIQUADRATO

curve(dchisq(x, df = 3), 0.,20, ylab = "Densità", col =
"red",  main = "Distribuzione CHI-Quadrato")

curve(dchisq(x, df = 5), 0.,20, ylab = "Densità", col =
"blue", lty = 2, add = T)

curve(dchisq(x, df = 7), 0.,20, ylab = "Densità", col =
"green", lty = 2, add = T)

legend(10,0.2, c("gdl = 3", "gdl = 5", "gdl = 7"), lty
= c(1, 2, 3))
```

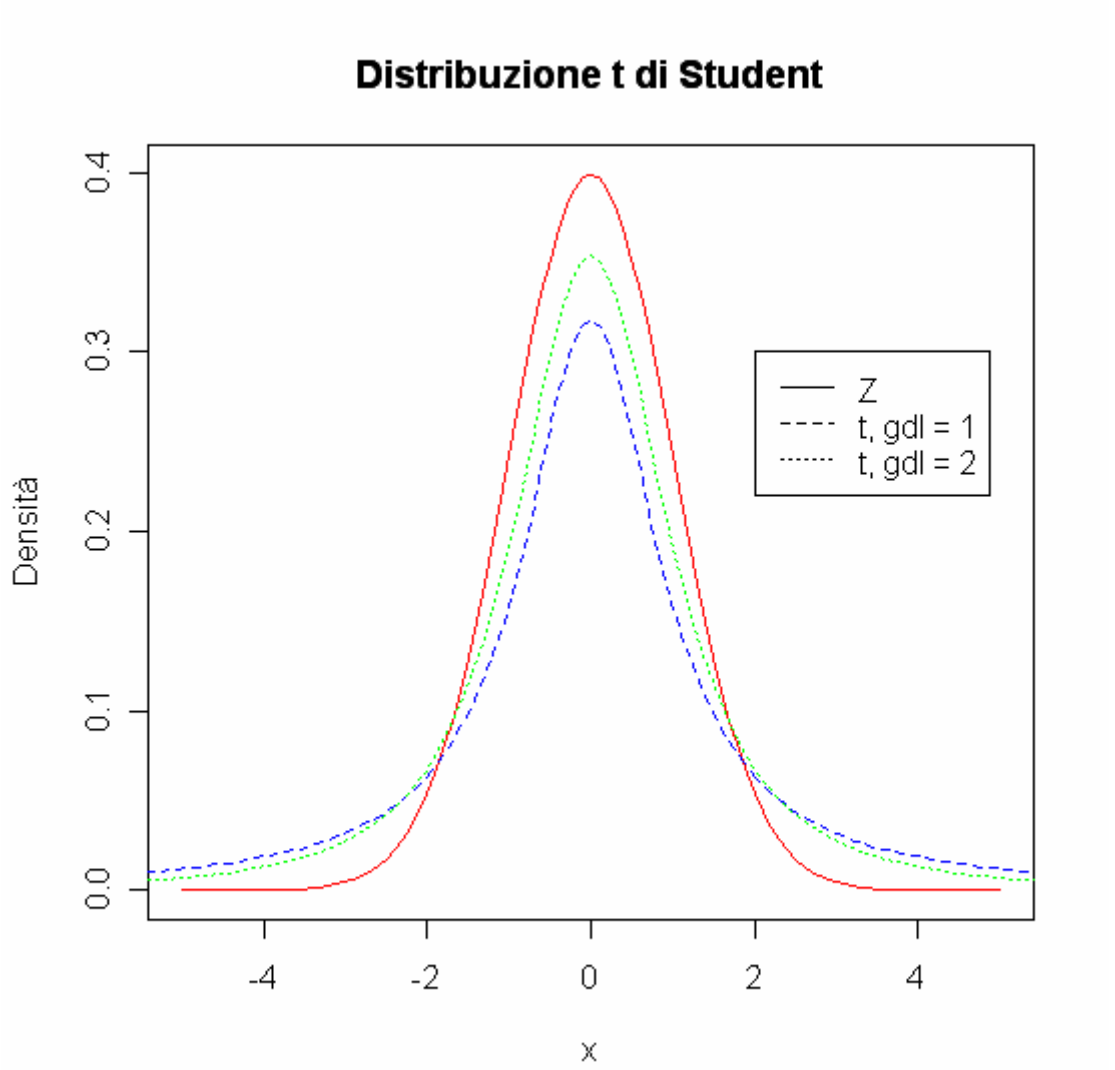
Distribuzione Chi-Quadrato



Distribuzione t di Student

```
##TSTUDENT

curve(dnorm(x), -5, 5, ylab = "Densità", col = "red",
main = "Distribuzione t di Student")

curve(dt(x, df = 1), -6, 6, lty = 2, col = "blue", add
= T)

curve(dt(x, df = 2), -6, 6, lty = 3, col = "green", add
= T)

legend(2,0.3, c("Z", "t, gdl = 1", "t, gdl = 2"), lty =
c(1, 2, 3))
```

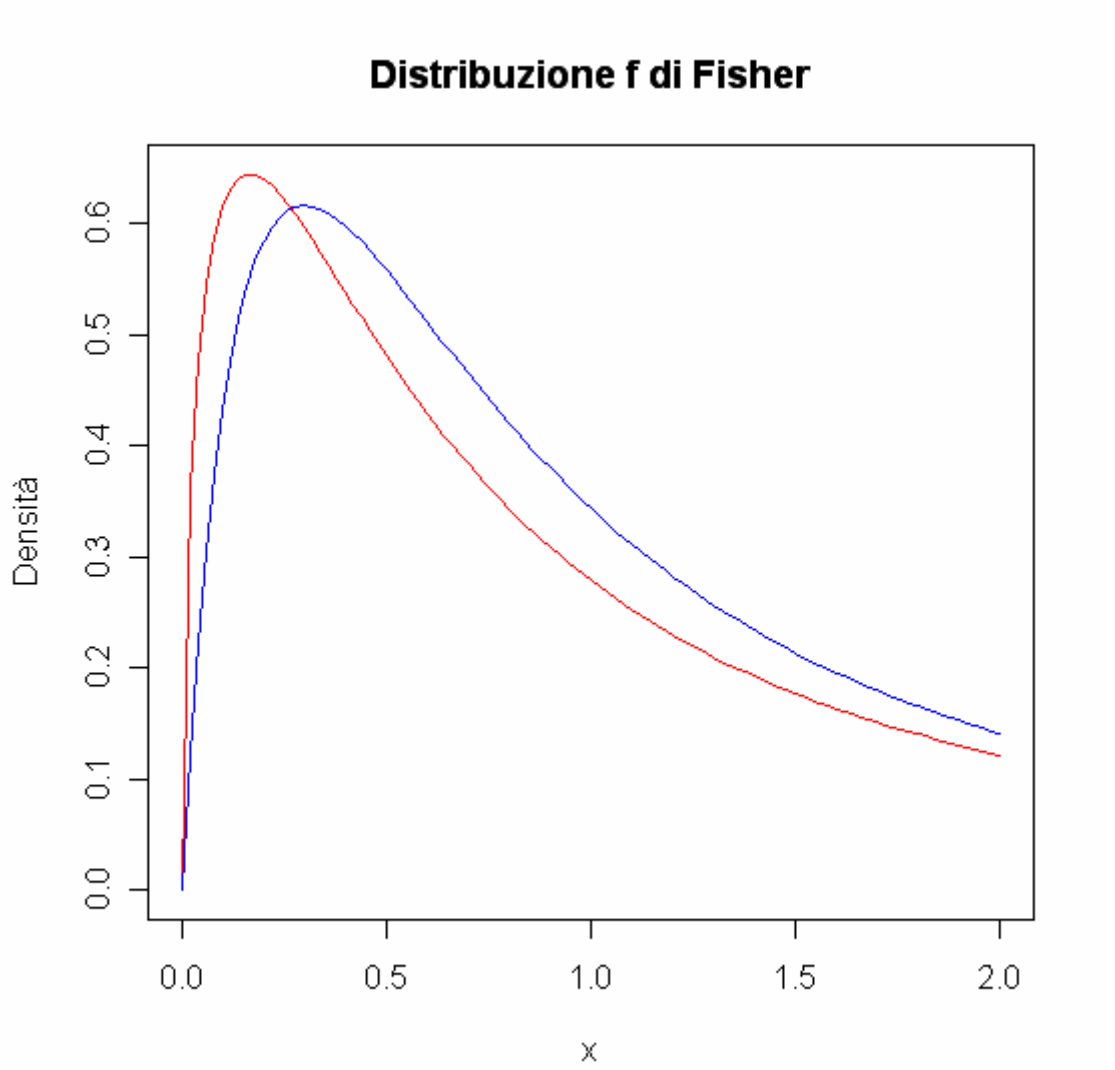
Distribuzione t di Student



Distribuzione F di Fisher

```
##FFISHER

curve(df(x, df1 =3, df2 = 2), 0, 2, ylab = "Densità",
col = "red",  main = "Distribuzione f di Fisher")

curve(df(x, df1 =4, df2 = 3), 0, 2, ylab = "Densità",
col = "blue", add = T)
```

Distribuzione F di Fisher



Distribuzione Beta

```
##BETA1


curve(dbeta(x,5,3), ylim=c(0,3), xlim=c(0,1),
ylab="Densità Beta")
```

Distribuzione Beta e parametri

```
##BETA2
curve(dbeta(x,1,1), ylim=c(0,3), xlim=c(0,1), ylab="Densità
Beta")
curve(dbeta(x,0.1,1), add = TRUE, lty = 3, col = "red")
curve(dbeta(x,1,0.1), add = TRUE, lty = 3, col = "red")
curve(dbeta(x,0.1,0.1), add = TRUE, lty = 2, lwd = 2, col =
"green")
curve(dbeta(x,4,4), add = TRUE, lty = 2, lwd = 2)
curve(dbeta(x,2,6), add = TRUE, lty = 2, lwd = 3, col = "blue")
curve(dbeta(x,6,2), add = TRUE, lty = 2, lwd = 3, col = "blue")
curve(dbeta(x,2,6), add = TRUE, lty = 2, lwd = 3, col = "blue")
curve(dbeta(x,2,2), add = TRUE, lty = 2, lwd = 3)
```

Distribuzione Beta e parametri