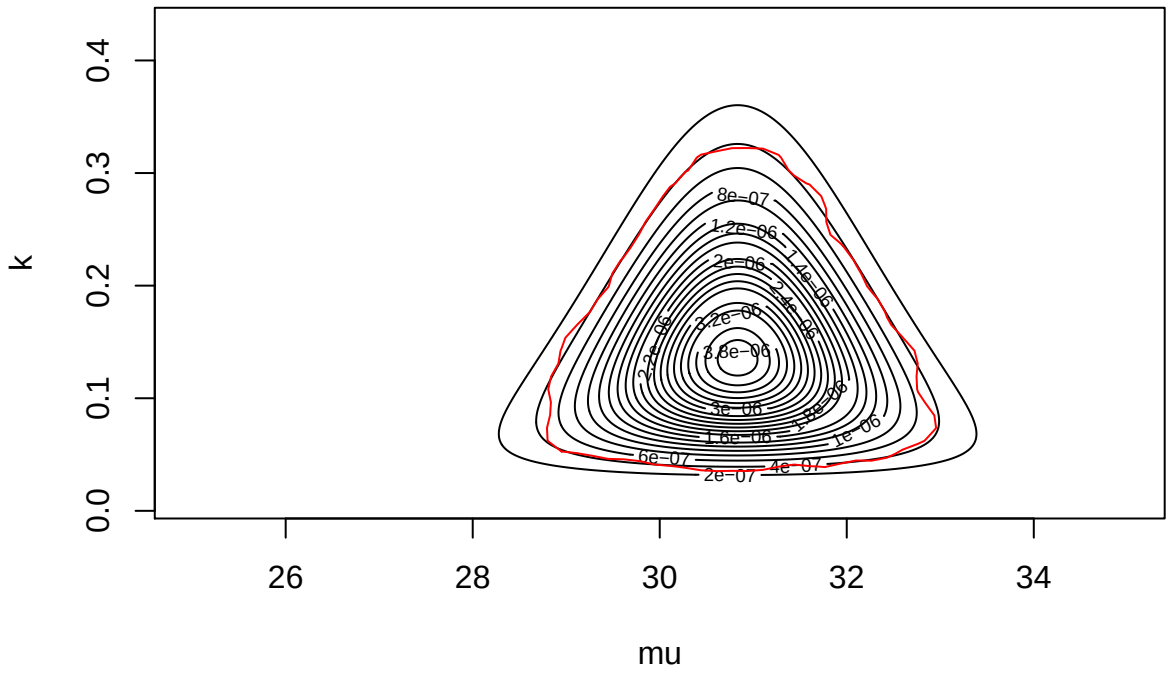
# labb13

*Andreas Dahlberg*

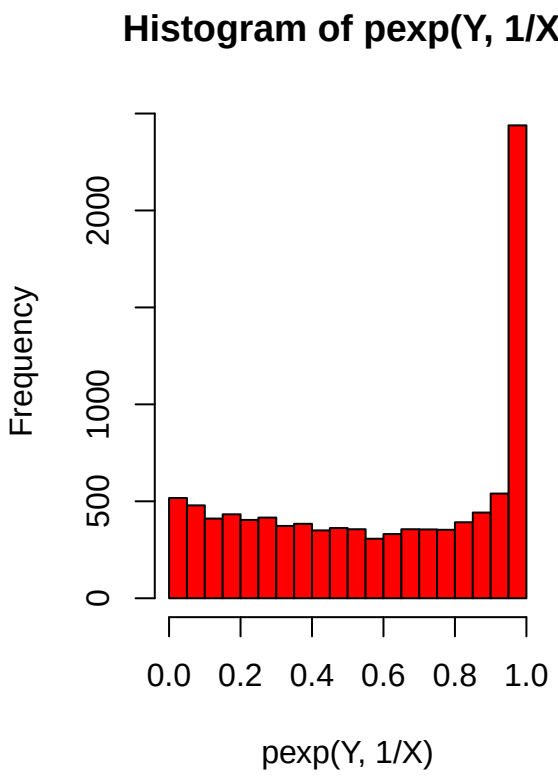
```
library(emdbook)
library(lestat)
```

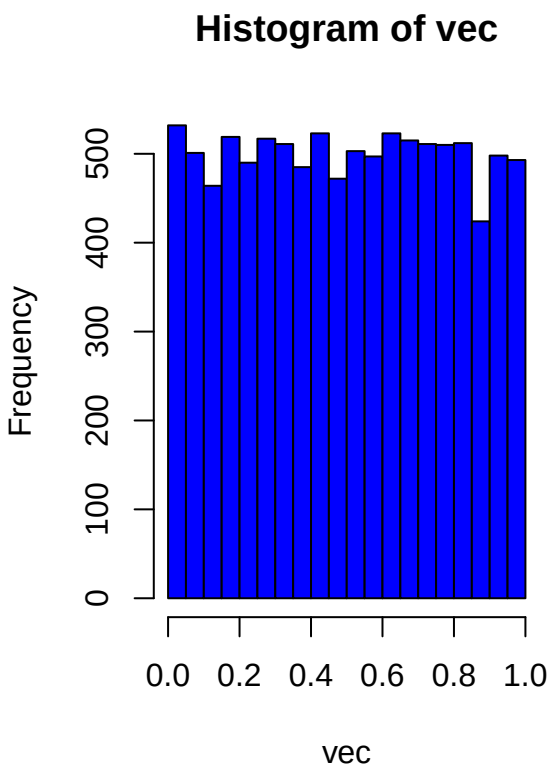
```
## Loading required package: MASS
```

```
rnormgamma <- function(n, mu, lambda, alpha, beta) {
  if (length(n) > 1)
    n <- length(n)
  tau <- rgamma(n, alpha, beta)
  x <- rnorm(n, mu, sqrt(1/(lambda*tau)))
  data.frame(x = x,tau=tau)
}

x = c(29.04, 34.06, 31.32, 28.51, 31.60, 35.55, 26.68, 30.91, 30.38, 30.28)
n = length(x)

v = mean(x)
l = n
a = n/2
b = n*var(x)/2

dnormalgamma <- function(x){
  mu = x[1]
  k = x[2]
  k^(a-1/2)*l^(1/2)*exp(-b*k)*exp(-l*k/2*(mu-v)^2)
}


mu = seq(25,35,length=300)
k = seq(0.01,0.43,length=300)
grid = expand.grid(mu,k)
z = apply(grid,1,function(x) dnormalgamma(x))
z = array(z,c(300,300))
contour(mu,k,z,ylab="k",nlevels=30,xlab="mu")

HPDregionplot(rnormgamma(10000,v,l,a,b), prob = 0.90, col="red",add=TRUE)
```




```
X = rexp(10000,2)
Y = rexp(10000,2)

cdf <- function (x,y){
  1-x/(x+y)
}
par(mfrow = c(1,2))
hist(pexp(Y,1/X),col = "red")

vec = c()
for (i in 1:length(X)){
  vec = append(vec,cdf(X[i],Y[i]))
}
hist(vec,col="blue")
```


Histogram of pexp(Y, 1/X)
Frequency
0
500
1000
2000
0.0
0.2
0.4
0.6
0.8
1.0
pexp(Y, 1/X)


Histogram of vec
Frequency
0
100
200
300
400
500
0.0
0.2
0.4
0.6
0.8
1.0
vec