206b_hw1

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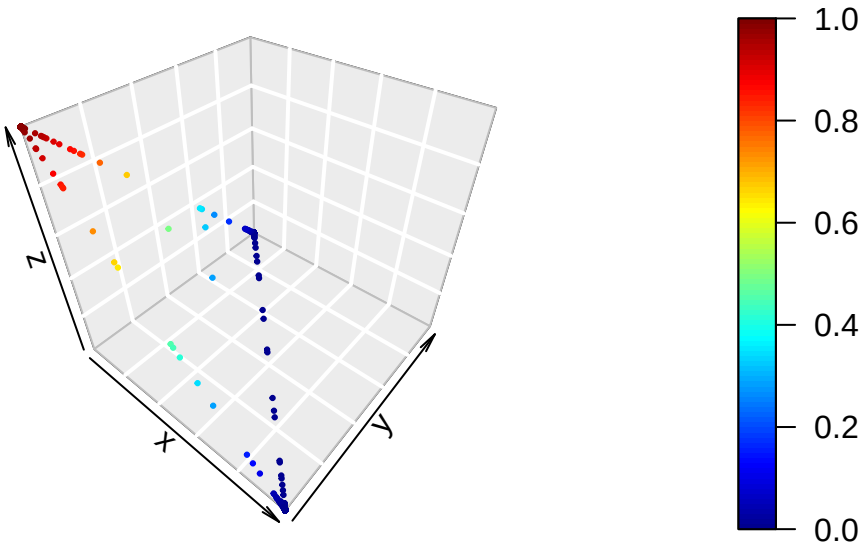
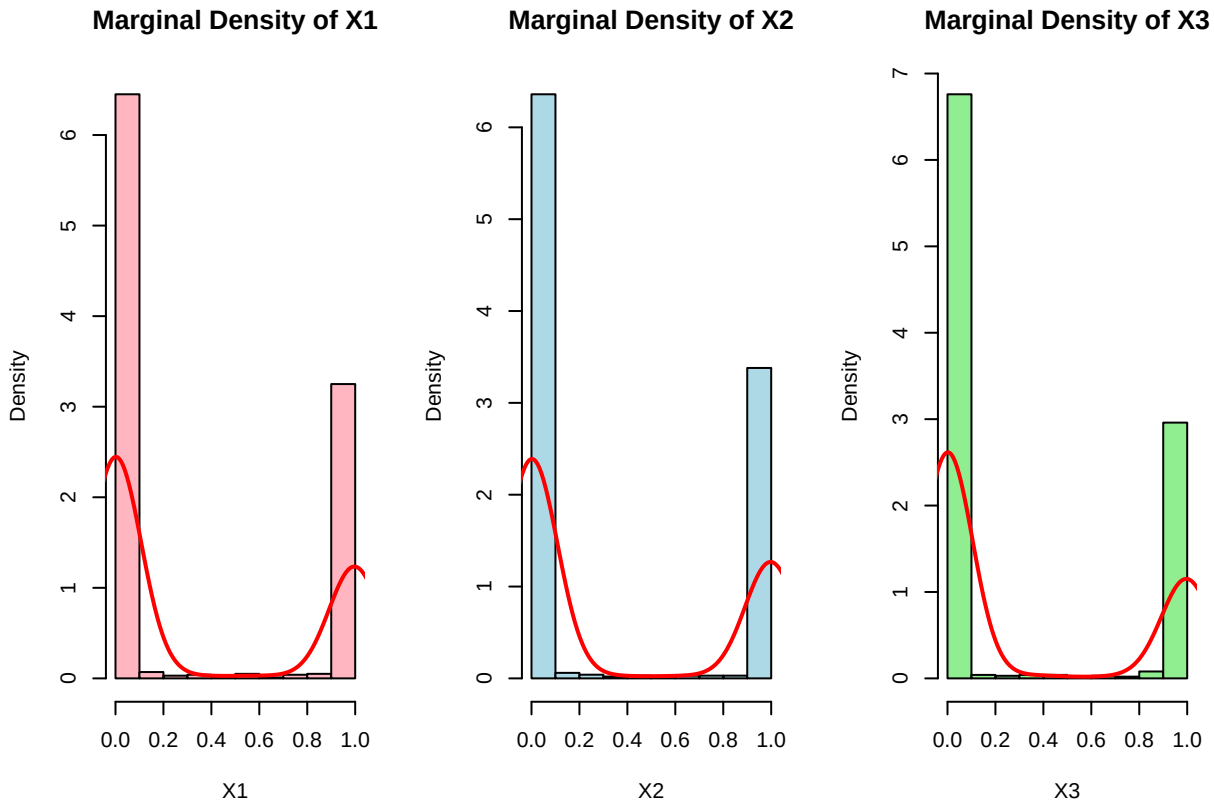
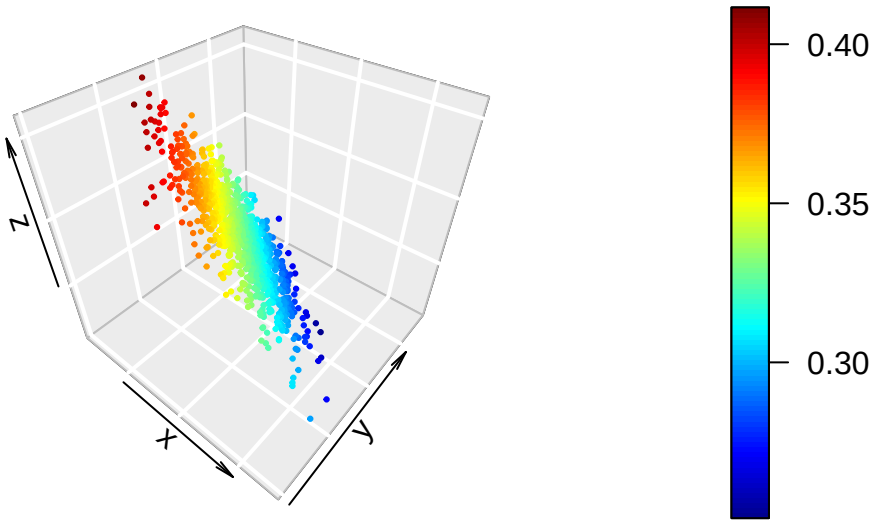
```
rdirich <- function(n, a){
  X <- matrix(NA, nrow = n, ncol = length(a))
  for (i in 1:length(a)) {
    X[,i] <- rgamma(n, shape = a[i], rate = 1)
  }
  D <- X/rowSums(X)
  par(mfrow = c(1,1))
  scatter3D(x = D[,1], y = D[,2], z = D[,3], pch = 19, cex = .3, bty = "g")
  par(mfrow = c(1,3))
  hist(D[,1], main = "Marginal Density of X1", prob = TRUE, xlab = "X1", col = "lightpink")
  lines(density(D[,1]), lwd = 2, col = "red")
  hist(D[,2], main = "Marginal Density of X2", prob = TRUE, xlab = "X2", col = "lightblue")
  lines(density(D[,2]), lwd = 2, col = "red")
  hist(D[,3], main = "Marginal Density of X3", prob = TRUE, xlab = "X3", col = "lightgreen")
  lines(density(D[,3]), lwd = 2, col = "red")
}
```

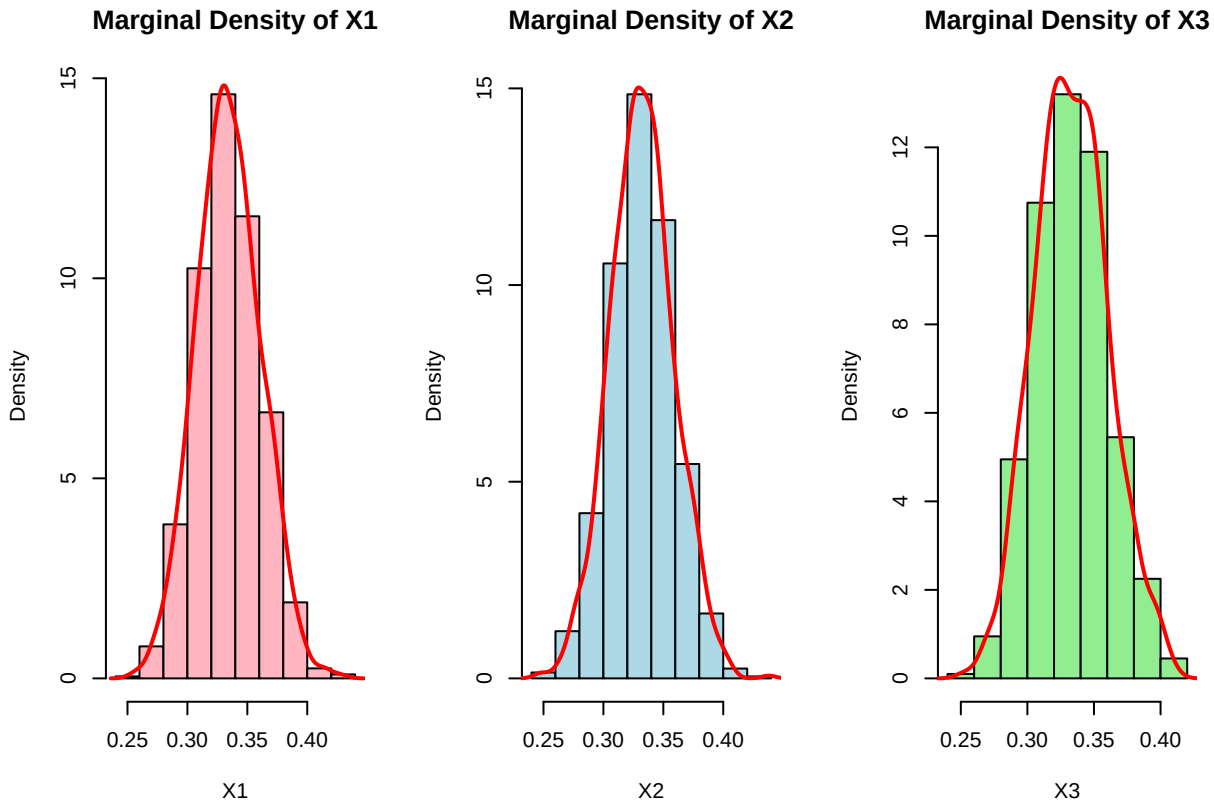
```
rdirich(1000, c(0.01, 0.01, 0.01))
```


z
x
y
1.0
0.8
0.6
0.4
0.2
0.0

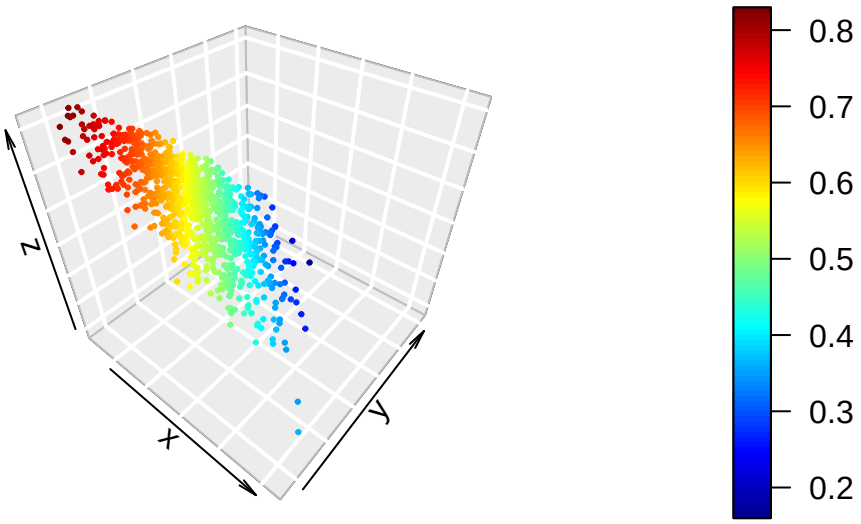


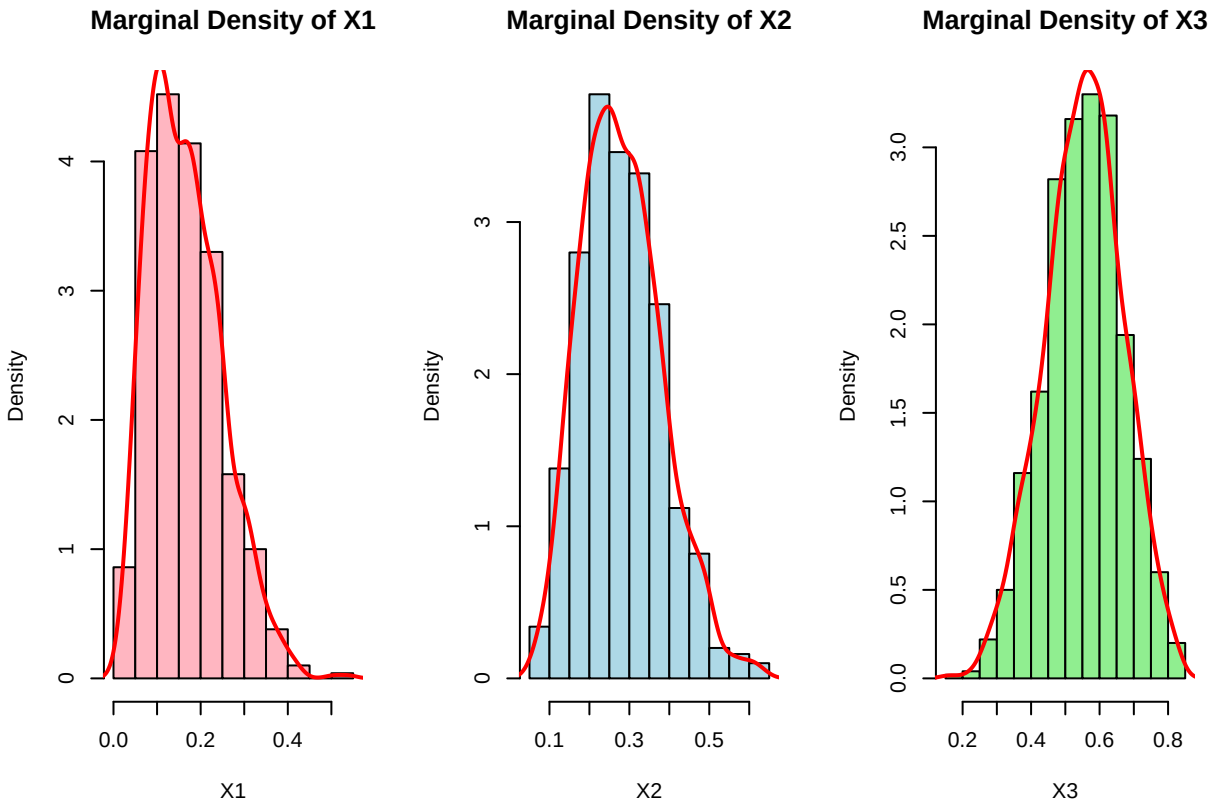

```
rdirich(1000, c(100, 100, 100))
```


z
x
y
0.40
0.35
0.30




```
rdirich(1000, c(3,5,10))
```


z
x
y
0.8
0.7
0.6
0.5
0.4
0.3
0.2


Marginal Density of X1
Density
0
1
2
3
4
0.0
0.2
0.4
X1
Marginal Density of X2
Density
0
1
2
3
0.1
0.3
0.5
X2
Marginal Density of X3
Density
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0.2
0.4
0.6
0.8
X3