مقدمة مبسطة في لغة R مع تطبيقات إحصائية

Introduction to R Language with Statistical Applications

سبأ محمد علوان

Exercise(1)

مثال : حساب بعض التكاملات :

$$\int_{0}^{\infty} r\, e^{-r*x} \quad dx$$

```
> r<- 0.5
> f<- function (x) {r*exp(-r *x)}
> integrate(f, lower=0, upper= 5)#P(x<5):x~exp(r)
0.917915 with absolute error < 1e-14
> integrate(f, lower=0, upper= Inf)
1 with absolute error < 3.4e-05
```

Exercise (2)

```
> fix(multiana)
> x1<-c(1,2,3,4,4,4,5,6,7,8,9,9,10)
> x2<-c(3,4,5,6,7,7,7,8,8,10,10,10,10)
> fix(multiana)
> multiana(x1,x2)
```

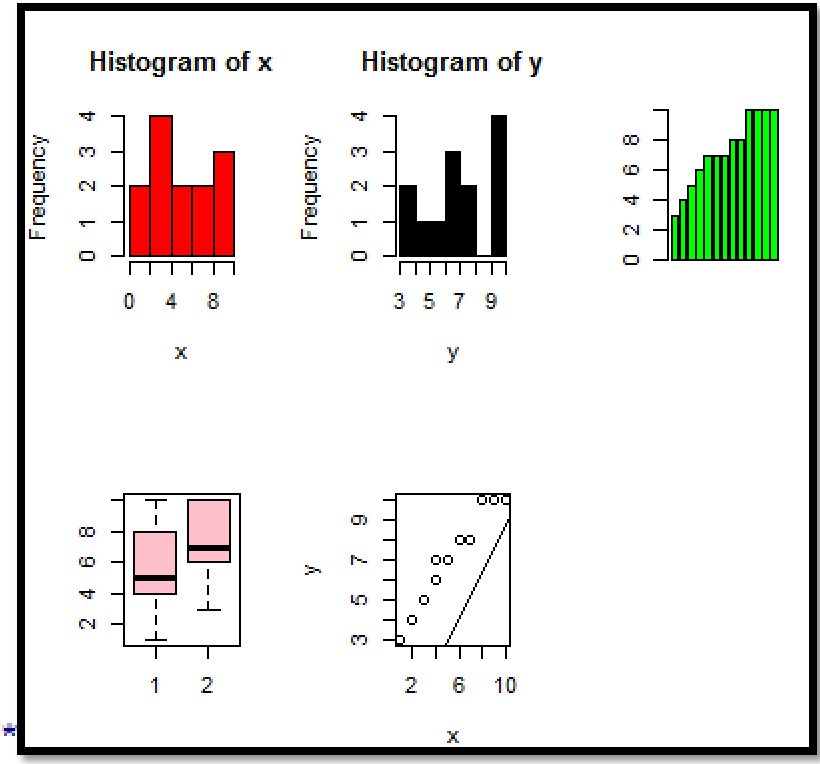
The outputs

multiana - R Editor

```
function(x,y)
{
z<-cbind(x,y)
par(mfrow=c(2,3))

hist(x, col="red")
hist(y, col="black")
barplot(y, col="green")
boxplot(x,y, col="pink")
plot(x,y)

summary(x)
summary(y)

fit<-lm(x~y)
abline(fit)
print(cor.test(x,y))
summary(fit)

}
```

The outputs

```
        Pearson's product-moment correlation

data:  x and y
t = 12.933, df = 11, p-value = 5.369e-08
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.8957386 0.9908234
sample estimates:
      cor 
0.9686551 


Call:
lm(formula = x ~ y)

Residuals:
    Min      1Q  Median      3Q     Max 
-1.1751 -0.3560  0.1866  0.3675  1.2823 

Coefficients:
            Estimate Std. Error t value Pr(>|t|)    
(Intercept) -3.09101    0.69860  -4.425  0.00102 ** 
y            1.18088    0.09131  12.933 5.37e-08 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1 

Residual standard error: 0.7461 on 11 degrees of freedom
Multiple R-squared:  0.9383,    Adjusted R-squared:  0.9327 
F-statistic: 167.3 on 1 and 11 DF,  p-value: 5.369e-08
```



Exercise (3)

```
> multi.tests<-function(x,y){}
> fix(multi.tests)
> x1<-c(1,2,3,4,4,4,5,6,7,8,9,9,10)
> x2<-c(3,4,5,6,7,7,7,8,8,10,10,10,10)
> multi.tests(x1,x2)
```

The outputs

multi.tests - R Edi...

```
function(x,y)

{
z<-cbind(x,y)

print(apply(z,2, mean))

cor.test(x,y)

print(t.test(x,mu=6))
print(t.test(x,y))

}
```

The outputs

```
       x        y
5.538462 7.307692

        One Sample t-test

data:  x
t = -0.57869, df = 12, p-value = 0.5735
alternative hypothesis: true mean is not equal to 6
95 percent confidence interval:
 3.800738 7.276186
sample estimates:
mean of x
 5.538462


        Welch Two Sample t-test

data:  x and y
t = -1.7151, df = 23.116, p-value = 0.0997
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -3.9025692  0.3641076
sample estimates:
mean of x mean of y
 5.538462  7.307692
```

Exercise (4)

$If\ x \sim N(0,1)$

$find:$

$P(-1.96 < x < 1.96),$

$P(-2.16 < x < 0)$

$P(x < 3)$

$P(x < 0)$

$P(x > 0)$

الافضل بناء الدالة التي تعرف دالة احتمال التوزيع الطبيعي القياسي ليتم استدعائها عند حدود التكامل المختلفة

inte - R Editor

```
function(a,b)
 {

f<- function(x){1/(sqrt(2*pi))*exp(-x^2/2)}

print(integrate(f, lower=a, upper=b))


}
```

هنا تم استدعاء الدالة عند الحدود المختلفة، وتظهر النتائج أسفل كل استدعاء

```
> inte<-function(a,b) {}
> fix(inte)
> inte(-1.96, 1.96)
0.9500042 with absolute error < 1e-11
> inte(-2.16, 0)
0.4846137 with absolute error < 5.4e-15
> inte(-Inf, 3)
0.9986501 with absolute error < 3.2e-05
> inte(-Inf, 0)
0.5 with absolute error < 4.7e-05
> inte(0,Inf)
0.5 with absolute error < 4.7e-05
> 
```