



## İST156 İSTATİSTİK GİRİŞ II

### UYGULAMA 1

HACETTEPE ÜNİVERSİTESİ

İSTATİSTİK BÖLÜMÜ

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**1.1- Daha önce SPSS'te soru1 ismiyle kaydedilen 1. soruya ait ekmek ağırlıklarının çağırılması ve R'da da soru1 olarak kaydedilmesi**

```
library(haven)
soru1 <- read_sav("C:/Users/Desktop/Uygulama_1/soru1.sav")
attach(soru1)
```

**1.2- Tanımlayıcı istatistiklerin elde edilmesi**

```
summary(ağırlık) # min, max, ortalama, medyan, çeyreklikler
##      Min. 1st Qu. Median      Mean 3rd Qu.      Max.
##    340.0    345.2   350.0    350.6   355.0    363.0

range(ağırlık)[2]-range(ağırlık)[1] # dağılım genişliği
## [1] 23

names(table(ağırlık))[which(table(ağırlık)==max(table(ağırlık)))] # tepe
değeri(mod)
## [1] "350"

var(ağırlık) # varyans
## [1] 36.24023

sd(ağırlık) # standart sapma
## [1] 6.019986

sd(ağırlık)/sqrt(length(ağırlık)) # standart hata
## [1] 1.099094

library(GLDEX)
## Warning: package 'GLDEX' was built under R version 3.5.3
## Loading required package: cluster

skewness(ağırlık) # çarpıklık katsayısı
## [1] 0.03362263

kurtosis(ağırlık) # basıklık katsayısı
## [1] -0.699623
```

### 1.3- Standartlaştırılmış değerlerin hesaplanması ve z\_agirlik olarak kaydedilmesi

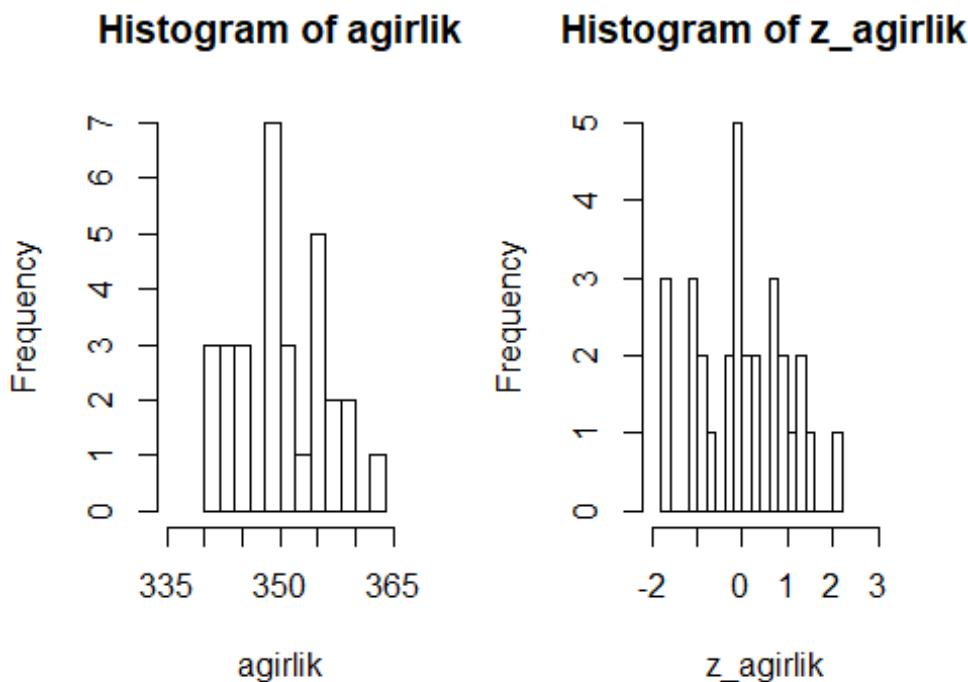
```
z_agirlik <- (ağırlık-mean(ağırlık))/sd(ağırlık)
head(z_agirlik,5) # verinin ilk 5 değeri
## [1] -0.1052051 -0.1052051 -0.7696585 -0.2713185 -1.1018852

mean(z_agirlik)
## [1] 1.250367e-15

var(z_agirlik)
## [1] 1
```

### 1.4- Orjinal ve standartlaştırılmış değerlerin grafiklerinin çizdirilmesi

```
x <- par(mfrow=c(1,2)) # grafikleri aynı pencerede çizme (tek satır iki sütunda
grafik çizme)
hist(ağırlık, breaks=15, xlim=c(335,365))
hist(z_agirlik, breaks=15, xlim=c(-2,3))
```



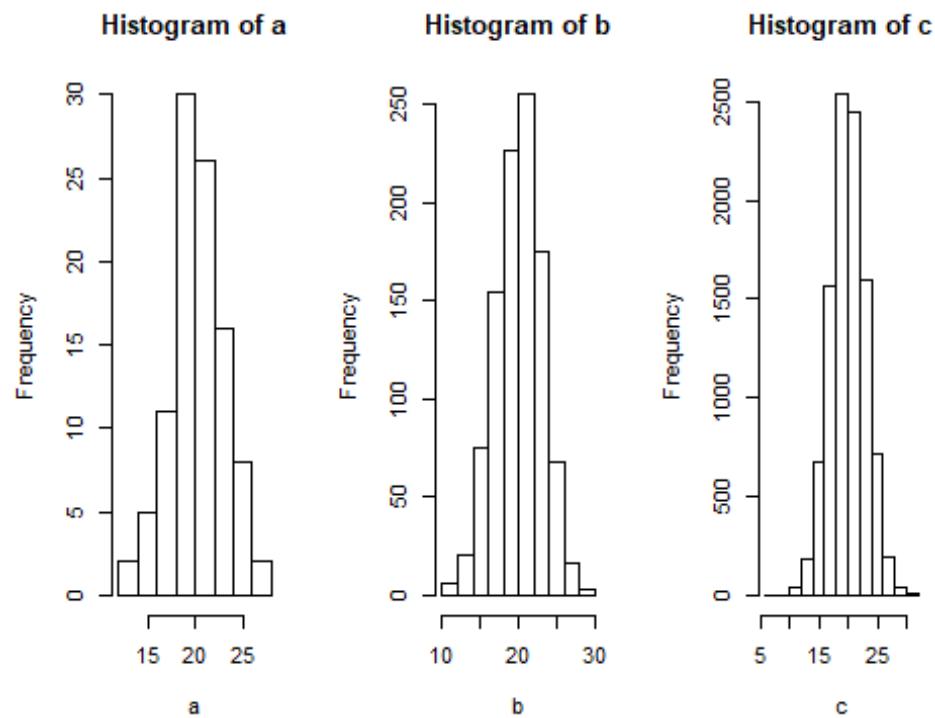
```
par(x) # pencerede çoklu grafik çiziminden çıkarılır
```

### 2.1- Ortalaması 20 ve varyansı 9 olan Normal dağılıma sahip veri üretme

```
a <- rnorm(100,20,3)
b <- rnorm(1000,20,3)
c <- rnorm(10000,20,3)
```

## 2.2- Üretilen sayılara ait grafiklerin çizdirilmesi

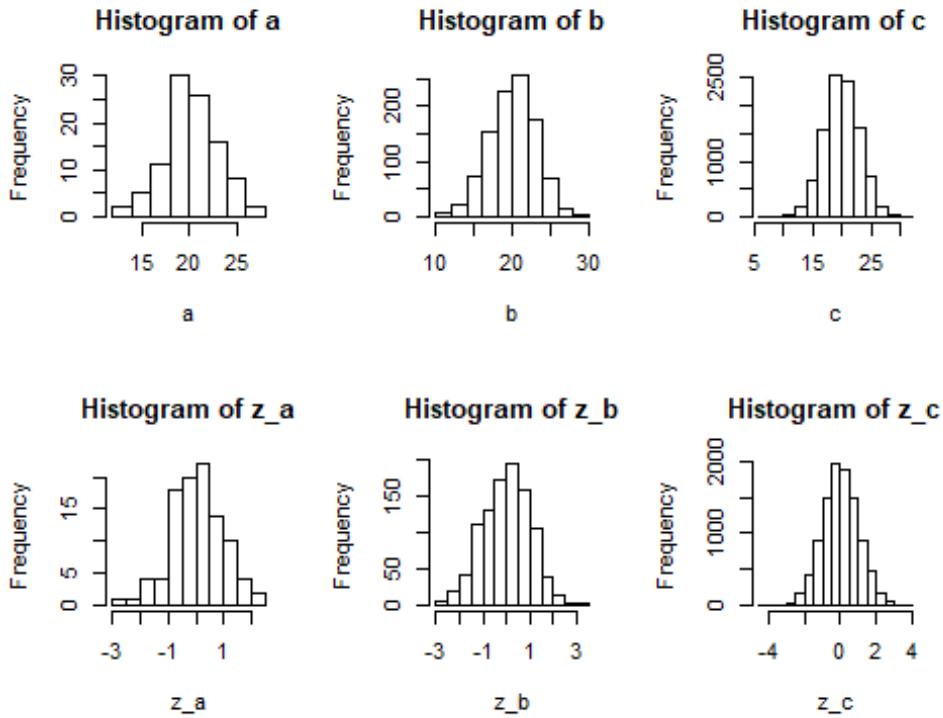
```
x <- par(mfrow=c(1,3)) # tek satır üç sütunda grafik çizme  
hist(a)  
hist(b)  
hist(c)
```



```
par(x)
```

## 2.3- Üretilen verilerin standartlaştırılması

```
z_a <- (a-20)/3  
z_b <- (b-20)/3  
z_c <- (c-20)/3  
  
x <- par(mfrow=c(2,3)) # 2 satır 3 sütunda grafik çizme  
hist(a)  
hist(b)  
hist(c)  
hist(z_a)  
hist(z_b)  
hist(z_c)
```



```
par(x)
```

### 3.1- Serbestlik derecesi 5 olan 10, 30 ve 100 büyüklüğünde t dağılımından veri üretme

```
?rt # rt fonksiyonu hakkında bilgi edinme
## starting httpd help server ... done

t1 <- rt(10, df=5)
t1
## [1]  0.324450448  0.626770575  0.681088200  0.551032514 -0.171709682
## [6]  0.047248645  0.006030498  0.400169549 -0.272291967 -0.412878958

t2 <- rt(30, df=5)
t2
## [1] -1.07932031 -2.63449528 -0.65188251 -0.11152506 -0.64365011  1.15417203
## [7]  0.48095388 -0.02303406  3.28874117 -1.71557857  0.39997130  1.74686489
## [13]  1.00286799  1.26201503 -0.42476163 -0.79862898 -0.41756015 -1.72168634
## [19]  0.10762186  0.45584271  0.52128730  0.22954530  0.75782576  0.17954899
## [25]  0.76641680  0.21627747 -3.96820072 -0.83112947  0.13710421 -0.18683430

t3 <- rt(100, df=5)
t3
## [1]  2.35438333 -1.70276161  2.11595255  0.13949895  0.38079567 -1.72413382
## [7]  0.74634892 -2.25197898  0.39977337  4.60011275 -0.74269285 -0.76871537
## [13] -4.10906151  3.45908334 -0.29795542  1.64782122  1.26557823  0.32388937
## [19]  0.25401117 -0.68584264 -0.51364344 -0.54277274 -1.11624729 -0.88522901
```

```

## [25] 2.10295252 1.00260218 -1.18576211 1.39126050 -0.22591440 0.12751674
## [31] -0.70010818 -0.87438273 -3.32205889 -0.29798433 -0.82009701 -1.71198048
## [37] -1.21729913 1.21585683 3.08230772 -5.68030680 -0.12633149 -2.14070737
## [43] 0.04586843 0.24720626 -0.32269020 0.03699001 0.28097511 -0.61207971
## [49] -0.02628327 -0.43287537 0.77817815 -1.72878674 -0.84915875 0.22595800
## [55] -0.03890861 -0.02827045 -0.14186591 1.31229929 -0.11074008 -0.50497099
## [61] -0.37875063 0.55446216 -2.87019133 -0.30642112 -6.04312751 1.02599315
## [67] 0.06799719 -0.60030179 1.60041826 -0.43358743 -1.75647531 -2.56518301
## [73] -0.47689039 -7.89741815 0.10422339 1.29864527 2.01846381 0.97127135
## [79] -1.40736959 0.49369583 1.47203929 2.35135806 0.64626013 -1.98417101
## [85] -0.72543630 -0.17116814 0.10490314 -0.28897898 -1.34938665 0.39112341
## [91] 1.01181163 -1.13141745 -2.08470097 -0.28132633 0.20419126 1.58017280
## [97] -0.75783694 1.34817121 -4.59898820 -2.52053058

```

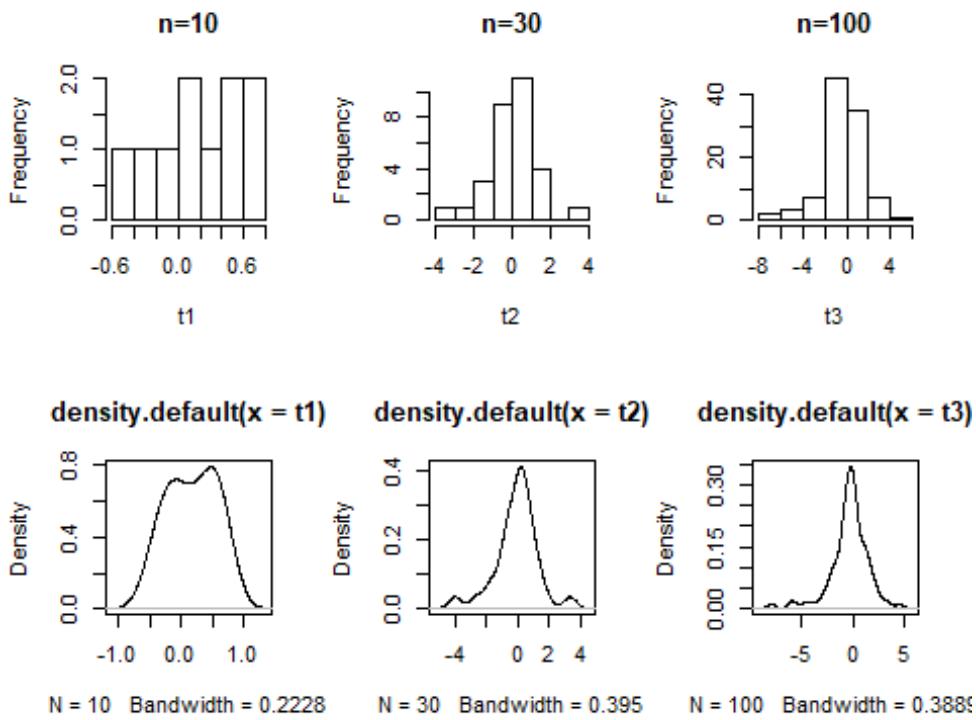
### 3.2- Üretilen sayılara ait grafiklerin çizdirilmesi

```

x <- par(mfrow=c(2, 3))
hist(t1, main="n=10")
hist(t2, main="n=30")
hist(t3, main="n=100")

plot(density(t1), type="l")
plot(density(t2), type="l")
plot(density(t3), type="l")

```



```
par(x)
```

### 3.3- Serbestlik dereceleri 5 ve 8 olan 10, 30 ve 100 büyüklüğünde F dağılımından veri üretme

```
?rf
f1 <- rf(10, df1=5, df2=8)
f1
## [1] 0.6245525 0.2773161 0.3619633 2.7267263 0.1471407 4.3472865 3.1890930
## [8] 0.2349734 0.6729489 0.8142182

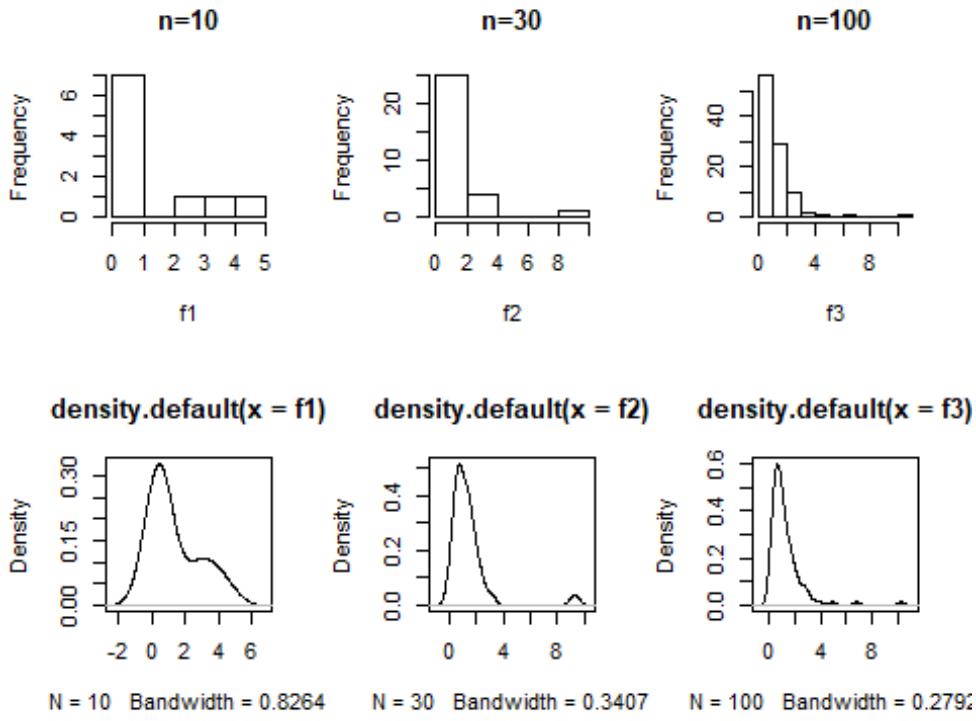
f2 <- rf(30, df1=5, df2=8)
f2
## [1] 1.8302351 0.7223293 0.5500113 0.1676124 2.2691961 0.6351532 0.6098410
## [8] 1.3655439 1.6857116 0.5653917 0.2906266 1.0156267 0.7234528 1.6390808
## [15] 1.4497213 1.2243968 0.0651331 3.1104503 0.9715294 1.3432960 9.2994982
## [22] 2.0904825 0.6048041 0.8251957 1.4521970 2.3783197 0.4297830 1.1080893
## [29] 1.5529360 0.8086933

f3 <- rf(100, df1=5, df2=8)
f3
## [1] 1.91053948 0.95675546 1.24994955 0.56820145 0.44369501 0.81961973
## [7] 0.64566865 0.46923825 0.59040401 2.17414817 1.23470058 0.41996913
## [13] 1.05820531 0.86558759 3.95580680 1.20743270 0.93255954 0.62135866
## [19] 1.87557871 0.54552150 1.15793795 1.03361215 1.38305981 1.80992313
## [25] 2.30612308 0.55298419 0.14542269 0.21679904 0.71678641 0.97598634
## [31] 0.51508185 0.05647187 0.29687314 0.84614314 0.75290299 1.57926734
## [37] 0.41580568 1.60370627 1.51932160 0.57707379 0.48579034 1.00114245
## [43] 1.51799386 0.65021565 0.72751064 0.77486133 0.24256255 0.49170908
## [49] 0.75957601 0.94262008 0.23035796 3.49118940 0.14486456 0.24921188
## [55] 0.17828917 2.05369881 0.72946837 2.13602417 0.76391797 1.43863545
## [61] 0.57008962 10.30732740 0.74155092 0.43454843 2.95585502 0.33642107
## [67] 1.61679489 2.60492397 6.76330014 0.95904119 2.82506588 0.27344398
## [73] 4.90564309 0.41938883 0.45551746 0.99277149 0.38659357 0.60691660
## [79] 0.81980778 1.01441411 0.75783614 0.46375771 1.12020714 1.49259311
## [85] 2.94450762 2.72648480 0.24621315 0.31445743 1.22366475 1.91732817
## [91] 1.35878165 1.96582593 1.33537059 2.53099158 1.66860161 0.21911518
## [97] 0.12946829 1.16798135 1.08281227 1.68543581
```

### 3.4- Üretilen sayılara ait grafiklerin çizdirilmesi

```
x <- par(mfrow=c(2,3))
hist(f1, main="n=10")
hist(f2, main="n=30")
hist(f3, main="n=100")

plot(density(f1),type="l")
plot(density(f2),type="l")
plot(density(f3),type="l")
```



```
par(x)
```

### 3.5- Serbestlik derecesi 5 olan 10, 30 ve 100 büyüklüğünde Ki-kare dağılımından veri üretme

```
?rchisq
k1 <- rchisq(10,5)
k1
## [1] 2.244166 1.627572 2.540375 4.126405 8.063498 6.840383 7.677936 6.272188
## [9] 3.309284 4.341297

k2 <- rchisq(30,5)
k2
## [1] 6.262470 4.420912 5.077498 7.097338 2.778156 5.632882 7.149060 4.664916
## [9] 4.291985 0.787719 3.541658 9.243508 4.644499 5.946938 4.582380 7.721704
## [17] 0.984709 3.336801 1.144390 4.163481 4.378767 6.178806 8.702390 3.395883
## [25] 6.837997 4.324749 1.635258 8.695034 5.915763 6.516955

k3 <- rchisq(100,5)
k3
## [1] 2.7412476 4.8821210 6.1994673 5.3921702 2.2929019 3.1417727
## [7] 0.6473307 7.9473591 4.2560781 15.0804536 6.3300493 2.6714885
## [13] 9.0904538 0.8627901 10.0905786 3.4174966 2.1019717 2.9919504
## [19] 2.1368589 7.1949884 1.1976280 3.2732603 2.1460001 3.6486050
## [25] 5.4519369 3.9020893 1.8066721 5.7775475 5.1953987 6.8595326
## [31] 4.0948331 5.5040844 3.0853121 4.3610434 3.6726587 3.1277965
## [37] 1.7661414 4.1063900 5.1889327 4.3810277 8.9122813 1.0162960
## [43] 0.8912128 9.9025275 8.1625670 0.6548383 3.2128234 3.3055149
```

```

## [49] 1.7403679 7.6640720 5.0530014 4.5261802 7.0417343 2.4804410
## [55] 5.0061104 4.1571773 6.0355037 4.1617284 4.6948006 9.4170268
## [61] 4.0481175 1.3972059 1.3540727 1.9482507 1.6531113 1.6250941
## [67] 5.5929773 7.4478291 4.6702875 5.8463853 3.2828991 5.5415337
## [73] 0.7432121 3.5694684 4.7594810 6.1636536 2.9814344 1.2421997
## [79] 2.5206400 0.6519178 2.2648188 7.6655944 5.2106076 6.0660713
## [85] 7.6224528 3.6643440 3.5981968 5.1177965 3.8490868 1.6460341
## [91] 15.6294497 0.6657329 1.9663547 1.6998103 7.0889362 3.7350134
## [97] 1.0598952 3.7780605 3.5233935 1.3566812

```

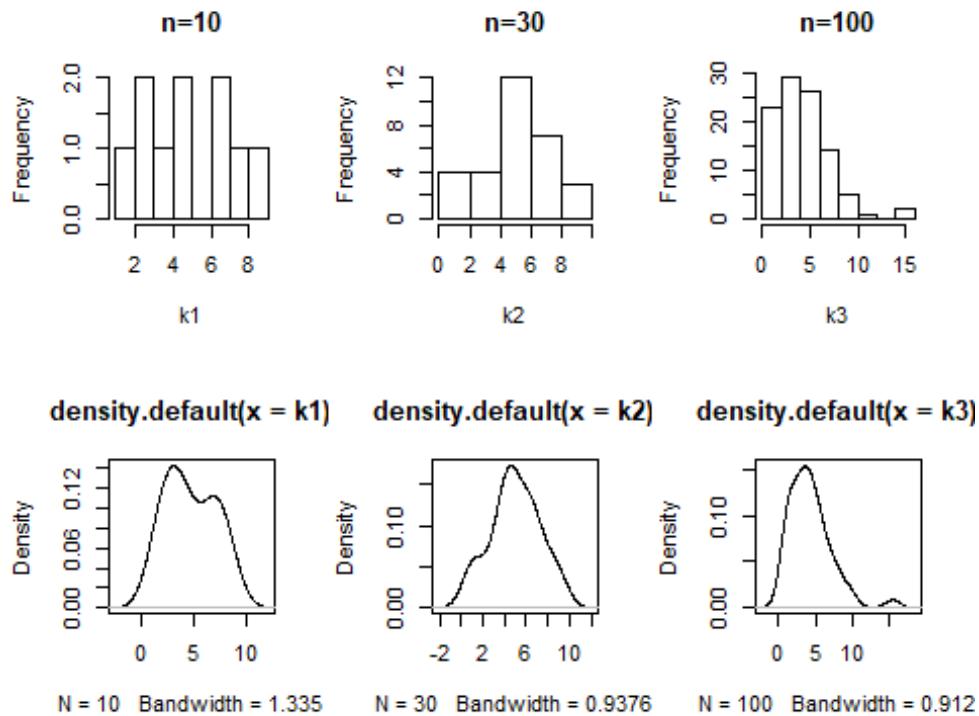
### 3.6- Üretilen sayılara ait grafiklerin çizdirilmesi

```

x <- par(mfrow=c(2, 3))
hist(k1, main="n=10")
hist(k2, main="n=30")
hist(k3, main="n=100")

plot(density(k1), type="l")
plot(density(k2), type="l")
plot(density(k3), type="l")

```



```
par(x)
```

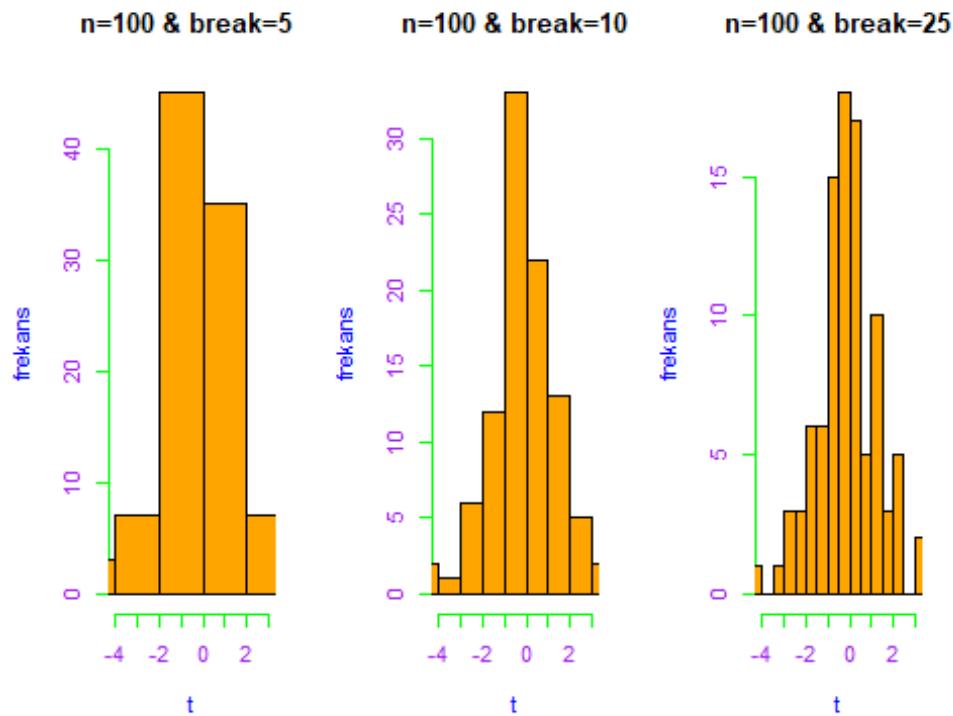
### Ekstra: Grafikler üzerinde değişiklikler yapma

```
x=par(mfrow=c(1,3))

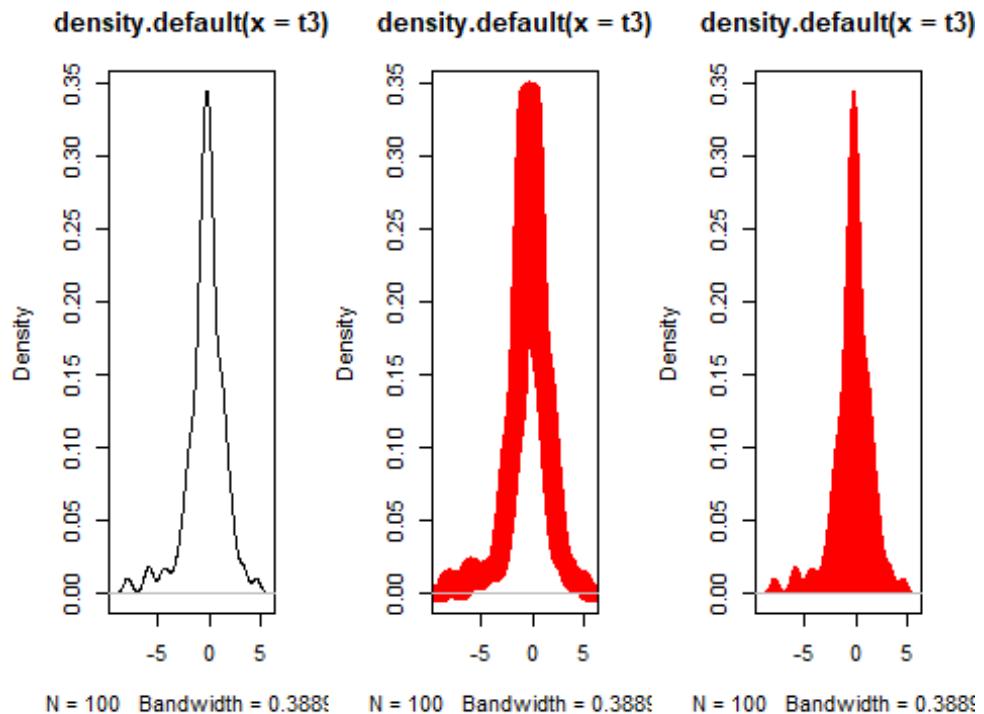
hist(t3, col="orange", main="n=100 & break=5 ",xlab="t", ylab="frekans",
col.axis="purple", col.lab="blue", fg="green", xlim=c(-4,3), breaks=5)

hist(t3, col="orange", main="n=100 & break=10",xlab="t", ylab="frekans",
col.axis="purple", col.lab="blue", fg="green", xlim=c(-4,3), breaks=10)

hist(t3, col="orange", main="n=100 & break=25",xlab="t", ylab="frekans",
col.axis="purple", col.lab="blue", fg="green", xlim=c(-4,3), breaks=25)
```



```
plot(density(t3),type="l")
plot(density(t3),type="l",, col="red", lwd=10)
plot(density(t3),type="h", col="red")
```



```
par(x)
```