EX 7 F-Test

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```r
s1_squared <- 100
s2_squared <- 80
n1 <- 25
n2 <- 30
alpha <- 0.05

sigma1_squared <- (n1 * s1_squared)/(n1-1)
sigma2_squared <- (n2 * s2_squared)/(n2-1)
print(sigma1_squared)
```

```
## [1] 104.1667
```

```r
F_stat <- sigma1_squared / sigma2_squared
F_stat1 <- s1_squared / s2_squared

df1 <- n1 - 1
df2 <- n2 - 1

F_critical <- qf(1 - alpha / 2, df1, df2)

F_stat
```

```
## [1] 1.258681
```

```r
F_stat1
```

```
## [1] 1.25
```

```r
F_critical
```

```
## [1] 2.154006
```

```r
if(F_stat > F_critical | F_stat < 1 / F_critical) {
print("Reject the null hypothesis")
} else {
print("Fail to reject the null hypothesis")
}
```

```
## [1] "Fail to reject the null hypothesis"
```

```r
s1_squared <- 25
s2_squared <- 20
n1 <- 15
n2 <- 18
alpha <- 0.05
```

```r
sigma1_squared <- (n1 * s1_squared)/(n1-1)
sigma2_squared <- (n2 * s2_squared)/(n2-1)
print(sigma1_squared)
```

```
## [1] 26.78571
```

```r
F_stat <- sigma1_squared / sigma2_squared
F_stat1 <- s1_squared / s2_squared

df1 <- n1 - 1
df2 <- n2 - 1

F_critical <- qf(1 - alpha / 2, df1, df2)
F_stat
```

```
## [1] 1.264881
```

```r
F_stat1
```

```
## [1] 1.25
```

```r
F_critical
```

```
## [1] 2.752641
```

```r
if(F_stat > F_critical | F_stat < 1 / F_critical) {
print("Reject the null hypothesis")
} else {
print("Fail to reject the null hypothesis")
}
```

```
## [1] "Fail to reject the null hypothesis"
```

```r
s1_squared <- 500
s2_squared <- 450
n1 <- 100
n2 <- 120
alpha <- 0.05

sigma1_squared <- (n1 * s1_squared)/(n1-1)
sigma2_squared <- (n2 * s2_squared)/(n2-1)
print(sigma1_squared)
```

```
## [1] 505.0505
```

```r
F_stat <- sigma1_squared / sigma2_squared
F_stat1 <- s1_squared / s2_squared

df1 <- n1 - 1
df2 <- n2 - 1
```

```r
F_critical <- qf(1 - alpha, df1, df2)
F_stat
```

```
## [1] 1.112982
```

```r
F_stat1
```

```
## [1] 1.111111
```

```r
F_critical
```

```
## [1] 1.37047
```

```r
if(F_stat > F_critical) {
print("Reject the null hypothesis")
} else {
print("Fail to reject the null hypothesis")
}
```

```
## [1] "Fail to reject the null hypothesis"
```

```r
s1_squared <- 0.25
s2_squared <- 0.20
n1 <- 50
n2 <- 60
alpha <- 0.05

sigma1_squared <- (n1 * s1_squared)/(n1-1)
sigma2_squared <- (n2 * s2_squared)/(n2-1)
print(sigma1_squared)
```

```
## [1] 0.255102
```

```r
F_stat <- sigma1_squared / sigma2_squared
F_stat1 <- s1_squared / s2_squared

df1 <- n1 - 1
df2 <- n2 - 1

F_critical <- qf(alpha, df1, df2)

F_stat
```

```
## [1] 1.254252
```

```r
F_stat1
```

```
## [1] 1.25
```

```r
F_critical
```

```
## [1] 0.6318137
```

```r
if(F_stat < F_critical) {
print("Reject the null hypothesis")
} else {
print("Fail to reject the null hypothesis")
}
```

```
## [1] "Fail to reject the null hypothesis"
```