**14. Hafta**

**R programlama dili ile istatistiksel uygulamalar**

R dilinde istatistiksle uygulamalara ilişkin çok sayıda fonksiyon mevcuttur.

**summary() fonksiyonu**

Verilerin özet istatistiklerini hesaplar.

**cov() fonksiyonu**

Verilerin kovaryans matrisini hesaplar.

**cor() fonksiyonu**

Verilerin korelasyon matrisini hesaplar. Verinin türüne göre Spearman, Kendall veya Pearson katsayıları kullanılır.

**lm() fonksiyonu**

Lineer regresyon modeli kurmak için kullanılır.

**Örnekler**

> veri<-longley

> summary(veri)

 GNP.deflator GNP Unemployed Armed.Forces Population Year Employed

 Min. : 83.00 Min. :234.3 Min. :187.0 Min. :145.6 Min. :107.6 Min. :1947 Min. :60.17

 1st Qu.: 94.53 1st Qu.:317.9 1st Qu.:234.8 1st Qu.:229.8 1st Qu.:111.8 1st Qu.:1951 1st Qu.:62.71

 Median :100.60 Median :381.4 Median :314.4 Median :271.8 Median :116.8 Median :1954 Median :65.50

 Mean :101.68 Mean :387.7 Mean :319.3 Mean :260.7 Mean :117.4 Mean :1954 Mean :65.32

 3rd Qu.:111.25 3rd Qu.:454.1 3rd Qu.:384.2 3rd Qu.:306.1 3rd Qu.:122.3 3rd Qu.:1958 3rd Qu.:68.29

 Max. :116.90 Max. :554.9 Max. :480.6 Max. :359.4 Max. :130.1 Max. :1962 Max. :70.55

> cov(veri)

 GNP.deflator GNP Unemployed Armed.Forces Population Year Employed

GNP.deflator 116.45763 1063.6041 625.8666 349.0254 73.50300 50.92333 36.79666

GNP 1063.60412 9879.3537 5612.4370 3088.0428 685.24094 470.97790 343.33021

Unemployed 625.86663 5612.4370 8732.2343 -1153.7876 446.27415 297.30333 164.91027

Armed.Forces 349.02537 3088.0428 -1153.7876 4843.0410 176.40981 138.24333 111.76811

Population 73.50300 685.2409 446.2742 176.4098 48.38735 32.91740 23.46197

Year 50.92333 470.9779 297.3033 138.2433 32.91740 22.66667 16.24093

Employed 36.79666 343.3302 164.9103 111.7681 23.46197 16.24093 12.33392

> cor(veri)

 GNP.deflator GNP Unemployed Armed.Forces Population Year Employed

GNP.deflator 1.0000000 0.9915892 0.6206334 0.4647442 0.9791634 0.9911492 0.9708985

GNP 0.9915892 1.0000000 0.6042609 0.4464368 0.9910901 0.9952735 0.9835516

Unemployed 0.6206334 0.6042609 1.0000000 -0.1774206 0.6865515 0.6682566 0.5024981

Armed.Forces 0.4647442 0.4464368 -0.1774206 1.0000000 0.3644163 0.4172451 0.4573074

Population 0.9791634 0.9910901 0.6865515 0.3644163 1.0000000 0.9939528 0.9603906

Year 0.9911492 0.9952735 0.6682566 0.4172451 0.9939528 1.0000000 0.9713295

Employed 0.9708985 0.9835516 0.5024981 0.4573074 0.9603906 0.9713295 1.0000000

> summary(lm(GNP~.,longley))

Call:

lm(formula = GNP ~ ., data = longley)

Residuals:

 Min 1Q Median 3Q Max

-3.9488 -1.3209 0.2327 0.7264 5.3511

Coefficients:

 Estimate Std. Error t value Pr(>|t|)

(Intercept) -3.021e+04 9.310e+03 -3.245 0.01007 \*

GNP.deflator 1.508e+00 6.190e-01 2.437 0.03757 \*

Unemployed -1.860e-01 4.733e-02 -3.929 0.00347 \*\*

Armed.Forces -5.913e-02 3.252e-02 -1.818 0.10240

Population 4.829e+00 1.388e+00 3.480 0.00694 \*\*

Year 1.543e+01 4.944e+00 3.121 0.01230 \*

Employed -3.148e+00 2.944e+00 -1.070 0.31268

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Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 2.858 on 9 degrees of freedom

Multiple R-squared: 0.9995, Adjusted R-squared: 0.9992

F-statistic: 3022 on 6 and 9 DF, p-value: 2.409e-14

Detaylı uygulamalar ders içerisinde yapılacaktır.