

Hidrolojide Olasılık Yöntemleri-8

Korelasyon ve Regresyon

Yüksek Lisans Dersi

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Örnek:

- Yenidoğan bebeklerin ağırlık (*kg*) ve beden(göğüs) genişliği (*cm*) arasındaki ilişkiyi belirlemek için bir araştırma yapılmış ve aşağıdaki sonuçlar elde edilmiştir.

Beden genişliği (X)	29,5	26,3	32,2	36,5	27,2	27,7	28,3	30,3	28,7
Ağırlık (Y)	2,75	2,15	4,41	5,42	3,21	4,32	2,31	4,30	3,71

Bu sonuçlara göre;

a) Korelasyon katsayısını hesaplayarak yorumlayınız.

$$r = \frac{n(\sum XY) - (\sum X)(\sum Y)}{\sqrt{[n(\sum X^2) - (\sum X)^2][n(\sum Y^2) - (\sum Y)^2]}}$$

	Beden genişliği (X)	Ağırlık (Y)	x2	y2	xy
	29.5	2.75	870.25	7.5625	81.125
	26.3	2.15	691.69	4.6225	56.545
	32.2	4.41	1036.84	19.4481	142.002
	36.5	5.42	1332.25	29.3764	197.83
	27.2	3.21	739.84	10.3041	87.312
	27.7	4.32	767.29	18.6624	119.664
	28.3	2.31	800.89	5.3361	65.373
	30.3	4.3	918.09	18.49	130.29
	28.7	3.71	823.69	13.7641	106.477
toplam	266.7	32.58	7980.83	127.5662	986.618

Xort	29.63333333
yort	3.62

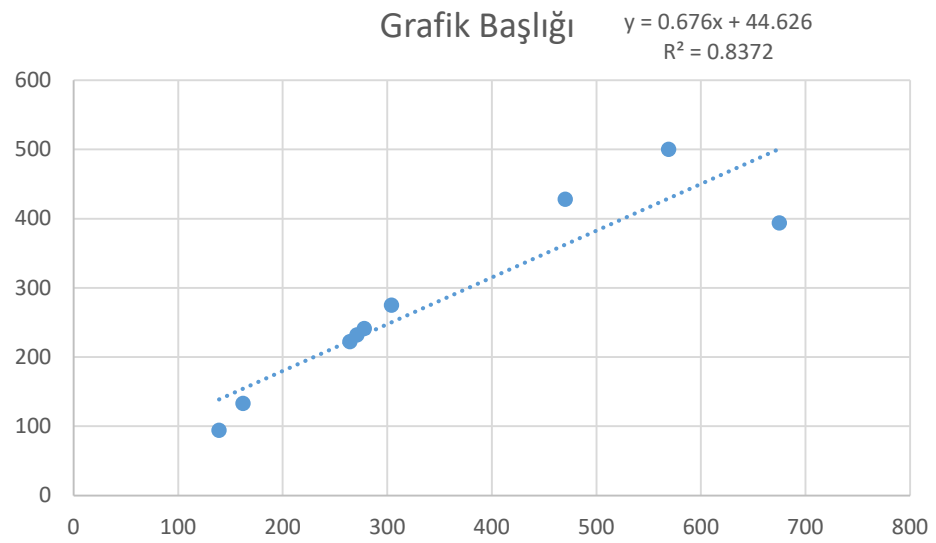
$$=((9*986.618)-(266.7*32.58))/(\text{KAREKÖK}((9*7980.83-(266.7^2))*(9*127.56-(32.58^2))))$$

Örnek:

- Göksu nehri üzerindeki 1720 no ve 1712 istasyonlarda çeşitli yıllarda ölçülen taşkın debileri (m^3/s)

1720	139	264	278	470	569	304	675	271	162
1712	94	222	241	428	500	275	394	232	133

- Excelde saçılma diyagramı, regresyon denklemini, denklemin katsayılarını, tanımlayıcı istatistiklerini
- SPSS'de regresyon analizini yapınız.



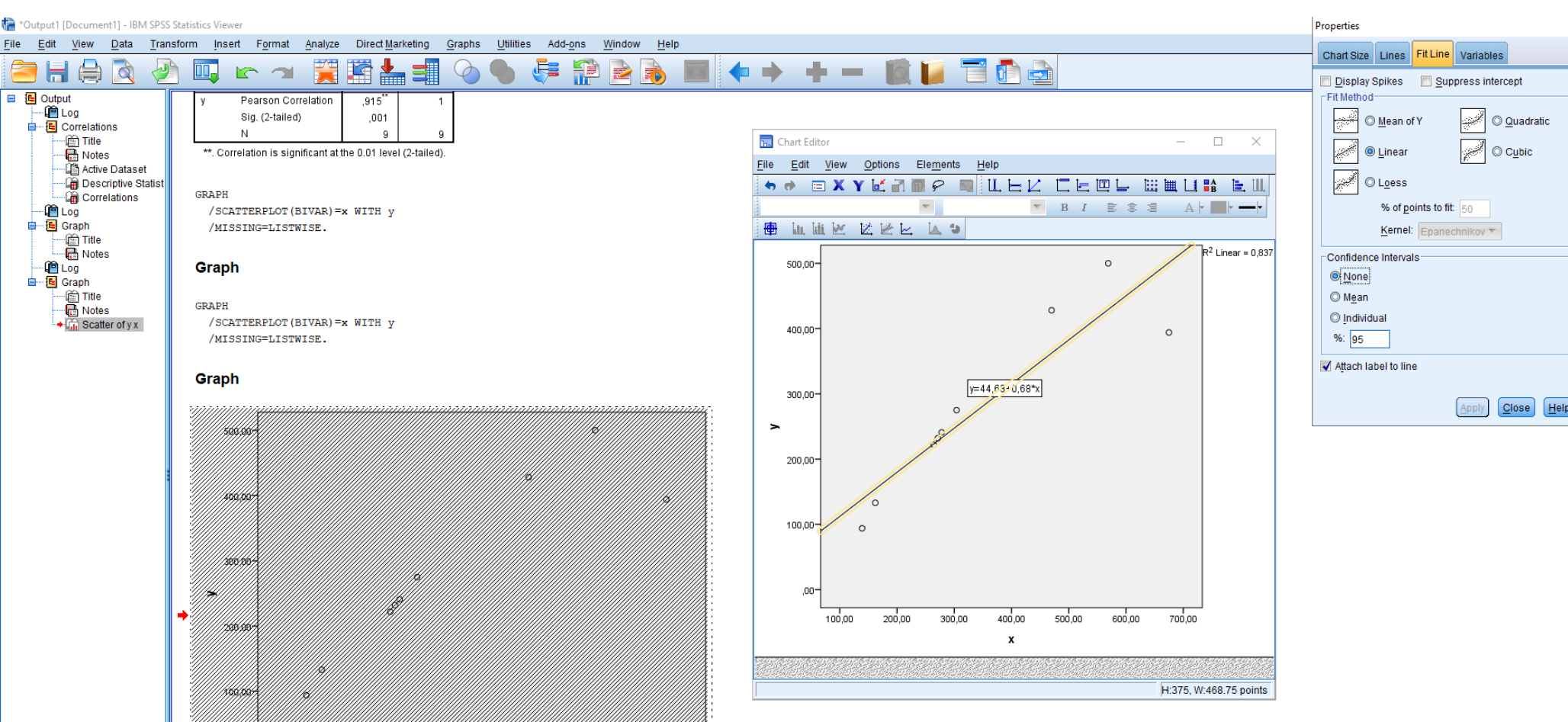
$b=0,676043341$

$a=44.6258062$

$y = 0.676x + 44.626$
 $R^2 = 0.8372$

Saçılma Diyagramı

- Graps-Legacy Dialogs-Scatter/Dot-Simple Scatter



Korelasyon analizi

- Spss Korelasyon
- Analyze-Correlate-Bivariate

Korelasyon analizi

*Output1 [Document1] - IBM SPSS Statistics Viewer

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Output
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Descriptive Statist
Correlations

```
CORRELATIONS  
  /VARIABLES=x y  
  /PRINT=TWOTAIL NOSIG  
  /STATISTICS DESCRIPTIVES  
  /MISSING=PAIRWISE.
```

Correlations

[DataSet0]

Descriptive Statistics

	Mean	Std. Deviation	N
x	348,0000	183,28666	9
y	279,8889	135,42474	9

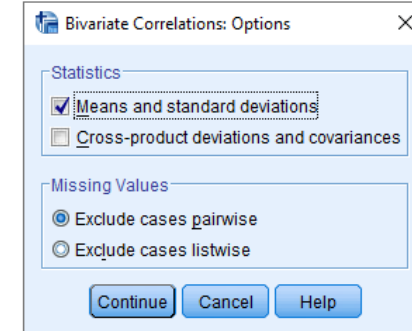
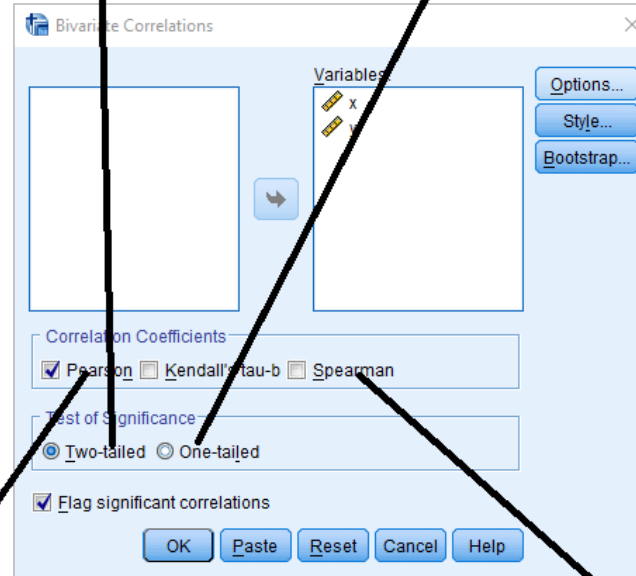
Correlations

		x	y
x	Pearson Correlation	1	,915**
	Sig. (2-tailed)		,001
	N	9	9
y	Pearson Correlation	,915**	1
	Sig. (2-tailed)	,001	
	N	9	9

**. Correlation is significant at the 0.01 level (2-tailed).

Bir yön
belirtmiyorsak

Pozitif yönlü bir
ilişki var
diyorsanız



Veri normal dağılıyorsa

Veri normal dağılmıyorsa

Korelasyon analizi

*Output1 [Document1] - IBM SPSS Statistics Viewer

IBM SPSS Statistics Viewer interface showing the output of a correlation analysis.

Correlations

[DataSet0]

Descriptive Statistics

	Mean	Std. Deviation	N
x	348,0000	183,28666	9
y	279,8889	135,42474	9

Correlations

	x	y
x	1	,915**
		,001
	9	9
y	,915**	1
	,001	
	9	9

** . Correlation is significant at the 0.01 level (2-tailed).

63% ↑ 1.05 KB/s
↓ 316 B/s

2 yıldız varsa 0,01 düzeyinde anlamlı korelasyon tek yıldız varsa 0,05 düzeyinde anlamlıdır.iki değişken arasında pozitif yönlü anlamlı bir ilişki vardır.

Regresyon analizi

- Analyze-Regression-Linear

The screenshot displays the IBM SPSS Statistics Data Editor interface. The main window shows a dataset with two columns, 'x' and 'y', containing numerical values. The 'x' column values range from 139.00 to 162.00, and the 'y' column values range from 94.00 to 500.00. The 'Linear Regression' dialog box is open, showing 'y' as the dependent variable and 'x' as the independent variable. The 'Method' is set to 'Enter'. The 'Linear Regression: Statistics' sub-dialog box is also open, showing various options for the regression analysis.

Linear Regression

Dependent: y

Block 1 of 1

Independent(s): x

Method: Enter

Selection Variable:

Case Labels:

WLS Weight:

Buttons: OK, Paste, Reset, Cancel, Help

Linear Regression: Statistics

Regression Coefficients

- ☒ Estimates
- ☐ Confidence intervals
- Level(%): 95
- ☐ Covariance matrix

☒ Model fit

- ☐ R squared change
- ☒ Descriptives
- ☒ Part and partial correlations
- ☐ Collinearity diagnostics

Residuals

- ☐ Durbin-Watson
- ☐ Casewise diagnostics
- ☒ Outliers outside: 3 standard deviations
- ☒ All cases

Buttons: Continue, Cancel, Help

Regresyon analizi

*Output1 [Document1] - IBM SPSS Statistics Viewer

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- Regression
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 - Correlations
 - Variables Entered
 - Model Summary
 - ANOVA
 - Coefficients

Descriptive Statistics

	Mean	Std. Deviation	N
y	279,8889	135,42474	9
x	348,0000	183,28666	9

Correlations

	y	x
Pearson Correlation	y	,915
	x	,915
Sig. (1-tailed)	y	,000
	x	,000
N	y	9
	x	9

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	x ^b	.	Enter

a. Dependent Variable: y
b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,915 ^a	,837	,814	58,41957

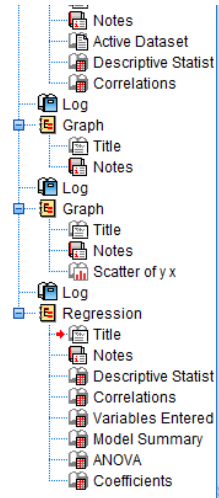
a. Predictors: (Constant), x

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	122828,963	1	122828,963	35,990	,001 ^b
	Residual	23889,926	7	3412,847		
	Total	146718,889	8			

Determinasyon katsayısı-Belirleme Katsayısı
Y'nin %83 ünü X le açıklayabiliyoruz.

Regresyon analizi



		y	x
Pearson Correlation	y	1,000	,915
	x	,915	1,000
Sig. (1-tailed)	y	.	,000
	x	,000	.
N	y	9	9
	x	9	9

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	x ^b	.	Enter

a. Dependent Variable: y

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,915 ^a	,837	,814	58,41957

a. Predictors: (Constant), x

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	122828,963	1	122828,963	35,990	,001 ^b
	Residual	23889,926	7	3412,847		
	Total	146718,889	8			

a. Dependent Variable: y

b. Predictors: (Constant), x

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	44,626	43,785		1,019	,342			
	x	,676	,113	,915	5,999	,001	,915	,915	,915

a. Dependent Variable: y

Sabit Sayı

Xin kaysayısı