

# Perancangan Percobaan

## KORELASI DAN REGRESI LINEAR TUNGGAL

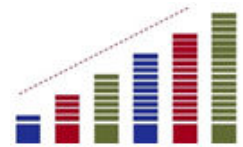


Dr. Diyan Herdiyantoro, S.P., M.Si.

**Departemen Ilmu Tanah**

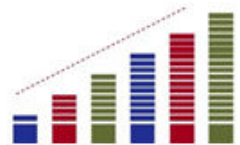
Fakultas Pertanian Universitas Padjadjaran

2022



# Korelasi Regresi

- Koefisien korelasi: Hubungan kualitatif antar *variable* (respons) pengukuran
  - Koefisien korelasi ( $r$ ), rentang nilai  $-1 < r < 1$  (Taylor, 1990)
    - ✓ Lemah =  $< 0,35$
    - ✓ Sedang =  $0,36-0,67$
    - ✓ Kuat =  $0,68-1$
- Koefisien determinasi: Seberapa besar secara kuantitatif hubungan tersebut
  - Koefisien determinasi ( $R^2$ )
  - Variabel sudah dibedakan antara variabel terikat (*dependent variable, y*) dan variabel bebas (*independent variable, x*)
  - Misalkan nilai  $R^2 = 0,97$  maka variabel terikat (*dependent variable, y*) dipengaruhi variabel bebas (*independent variable, x*) sebesar:  $0,97 * 100\% = \mathbf{97\%}$ , sisanya  $100\% - 97\% = \mathbf{3\%}$  dipengaruhi variabel lain yang tidak diukur pada penelitian tersebut.



# Teladan 1 – Korelasi (Data Mentah 1)

Analyze > Correlate > Bivariate

a gabungan - regresi tunggal.sav [DataSet...]

File Edit View Data Transform Analyze Graphs Utilities  
Window Help

28 : perlakuan

	perlakuan	ulangan	diameter batang	serapan k
1	A0	ulangan1	3,65	,02
2	A0	ulangan2	5,20	,01
3	A0	ulangan3	7,25	,02
4	A1	ulangan1	9,39	,05
5	A1	ulangan2	7,52	,04
6	A1	ulangan3	9,55	,04
7	A2	ulangan1	9,16	,05
8	A2	ulangan2	11,19	,04
9	A2	ulangan3	8,24	,04
10	A3	ulangan1	5,22	,03
11	A3	ulangan2	12,14	,03
12	A3	ulangan3	7,94	,01
13	A4	ulangan1	11,88	,04
14	A4	ulangan2	15,17	,03
15	A4	ulangan3	8,50	,04
16	A5	ulangan1	5,31	,03
17	A5	ulangan2	9,49	,01
18	A5	ulangan3	8,24	,03
19	A6	ulangan1	12,46	,07
20	A6	ulangan2	8,17	,04
21	A6	ulangan3	10,55	,03
22	A7	ulangan1	13,45	,08
23	A7	ulangan2	14,51	,03
24	A7	ulangan3	8,60	,04
25	A8	ulangan1	12,18	,05
26	A8	ulangan2	11,65	,09
27	A8	ulangan3	9,44	,04

Data View Variable View

SPSS

Bivariate Correlations

Variables:

Perlakuan [perlakuan]  
Ulangan [ulangan]  
Diameter Batang (mm)  
Serapan K (g/tanaman)

Correlation Coefficients  
 Pearson  Kendall's tau-b  Spearman

Test of Significance  
 Two-tailed  One-tailed

Flag significant correlations

Options...

Bivariate Correlations

Variables:

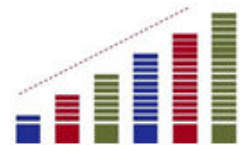
Diameter Batang (mm)  
Serapan K (g/tanaman)

Correlation Coefficients  
 Pearson  Kendall's tau-b  Spearman

Test of Significance  
 Two-tailed  One-tailed

Flag significant correlations

Options...



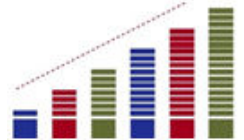
# Hasil Korelasi

Correlations

		Diameter Batang (mm)	Serapan K (g/tanaman)
Diameter Batang (mm)	Pearson Correlation	1	,467*
	Sig. (2-tailed)		,014
	N	27	27
Serapan K (g/tanaman)	Pearson Correlation	,467*	1
	Sig. (2-tailed)	,014	
	N	27	27

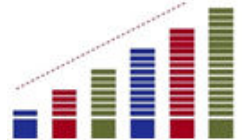
\*. Correlation is significant at the 0.05 level (2-tailed).

- Korelasi: Hubungan antar respons pengukuran
  - Koefisien korelasi ( $r$ ), rentang nilai  $-1 < r < 1$  (Taylor, 1990)
    - ✓ Lemah =  $< 0,35$
    - ✓ Sedang =  $0,36-0,67$
    - ✓ Kuat =  $0,68-1$



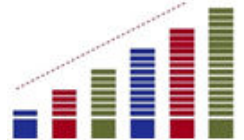
# Regresi Linear Tunggal

- Tujuannya untuk melihat apakah *independent variable* ( $x$ ) mampu memprediksi *dependent variable* ( $y$ ). Dalam hal ini terdapat 1 *independent variable* ( $x$ ).
- Uji asumsi yang harus dipenuhi:
  - Normalitas residu; Residu terdistribusi normal
  - (Linearitas); Apakah *independent variable* linear dengan *dependent variable*?; Model regresi akan sia-sia jika linearitas tidak terpenuhi
  - Homoskedastisitas; Untuk melihat apakah varians residu dipengaruhi faktor-faktor lain



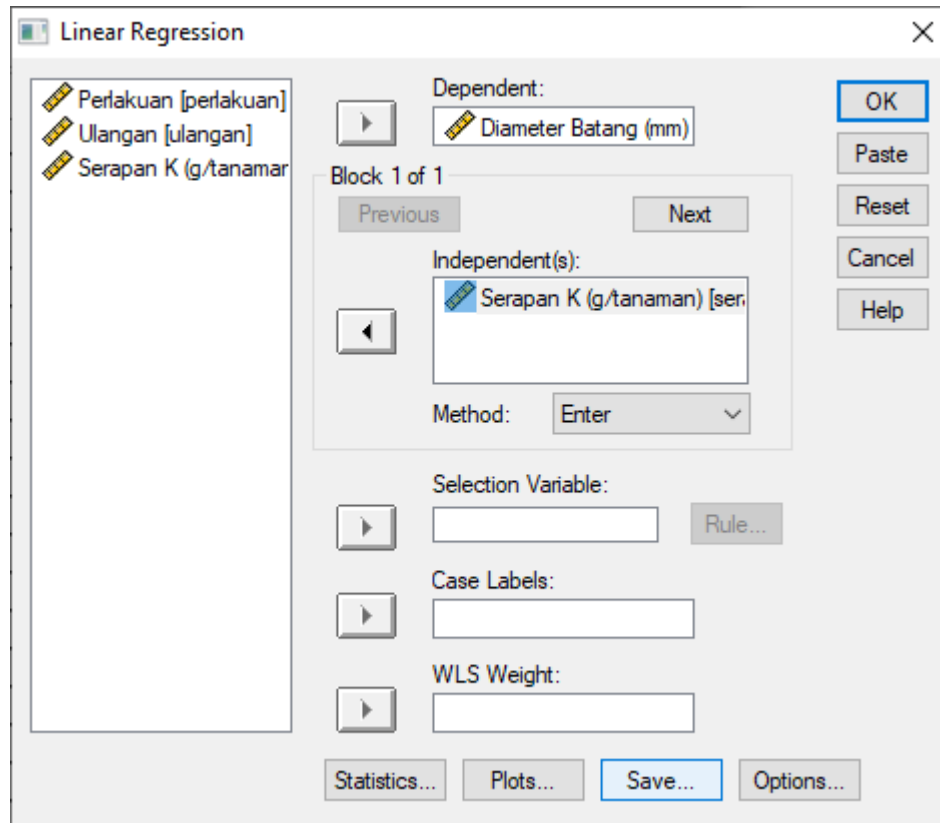
## Teladan 2 – Regresi Tunggal (Data Mentah 1)

- Data Mentah-1
- Pertanyaan Penelitian: Apakah serapan K mampu memprediksi diameter batang
- *Dependent Variable*: Diameter batang
- *Independent Variable*: Serapan K
- Analisis Statistika: Regresi linear tunggal

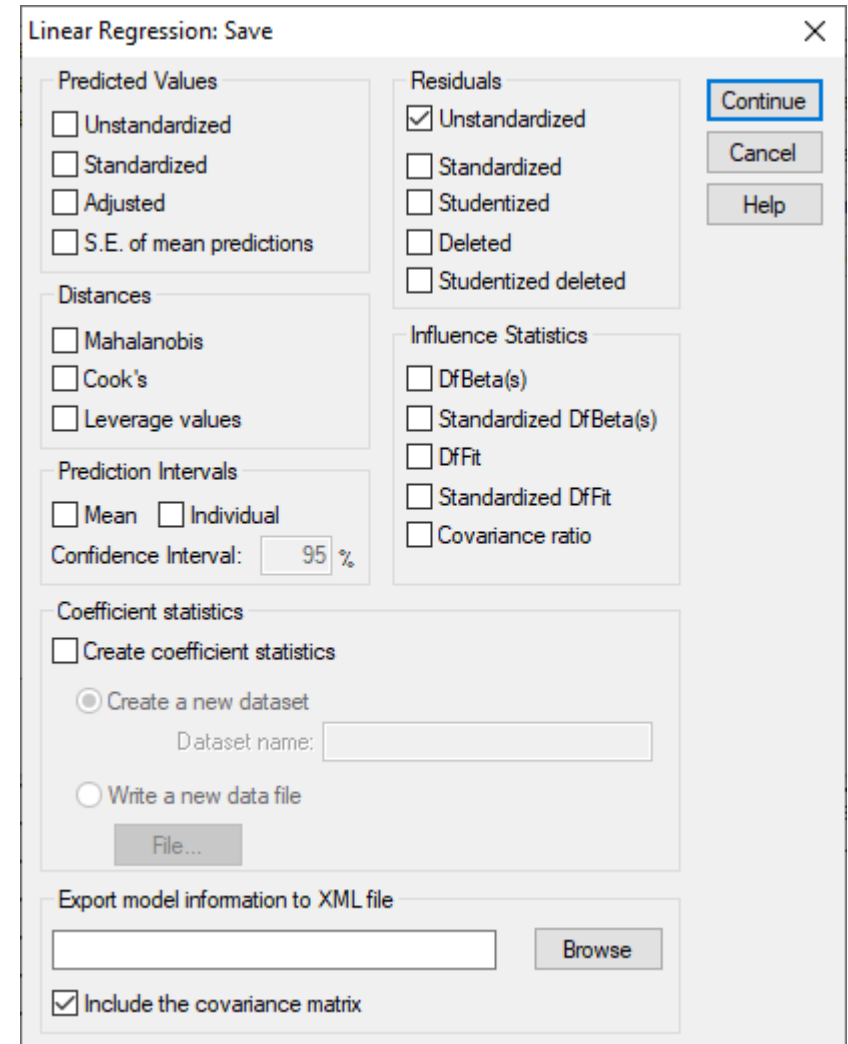


# Uji Normalitas Residu

1) Analyze > Regression > Linear



Linear Regression dialog box. The 'Dependent' variable is 'Diameter Batang (mm)'. The 'Independent(s)' variable is 'Serapan K (g/tanaman) [ser...'. The 'Method' is set to 'Enter'. There are buttons for 'OK', 'Paste', 'Reset', 'Cancel', and 'Help'. At the bottom, there are buttons for 'Statistics...', 'Plots...', 'Save...', and 'Options...'.



Linear Regression: Save dialog box. It contains several sections with checkboxes: 'Predicted Values' (Unstandardized, Standardized, Adjusted, S.E. of mean predictions), 'Distances' (Mahalanobis, Cook's, Leverage values), 'Prediction Intervals' (Mean, Individual, Confidence Interval: 95%), 'Coefficient statistics' (Create coefficient statistics, Create a new dataset, Write a new data file), 'Residuals' (Unstandardized, Standardized, Studentized, Deleted, Studentized deleted), and 'Influence Statistics' (DfBeta(s), Standardized DfBeta(s), DfFit, Standardized DfFit, Covariance ratio). There are buttons for 'Continue', 'Cancel', and 'Help'. At the bottom, there is a section for 'Export model information to XML file' with a 'Browse' button and a checked 'Include the covariance matrix' checkbox.

\*a gabungan - regresi tunggal.sav [DataSet1] - SPSS Data Editor

File Edit View Data Transform Analyze Graphs Utilities Window Help

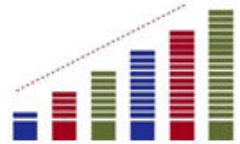
1 : RES\_1 -4,54570078740158

	perlakuan	ulangan	diameter batang	serapan k	RES_1
1	A0	ulangan1	3,65	,02	-4,54570
2	A0	ulangan2	5,20	,01	-2,28619
3	A0	ulangan3	7,25	,02	-,94570
4	A1	ulangan1	9,39	,05	-,93424
5	A1	ulangan2	7,52	,04	-2,09472
6	A1	ulangan3	9,55	,04	-,06472
7	A2	ulangan1	9,16	,05	-1,16424
8	A2	ulangan2	11,19	,04	1,57528
9	A2	ulangan3	8,24	,04	-1,37472
10	A3	ulangan1	5,22	,03	-3,68521
11	A3	ulangan2	12,14	,03	3,23479
12	A3	ulangan3	7,94	,01	,45381
13	A4	ulangan1	11,88	,04	2,26528
14	A4	ulangan2	15,17	,03	6,26479
15	A4	ulangan3	8,50	,04	-1,11472
16	A5	ulangan1	5,31	,03	-3,59521
17	A5	ulangan2	9,49	,01	2,00381
18	A5	ulangan3	8,24	,03	-,66521
19	A6	ulangan1	12,46	,07	,71674
20	A6	ulangan2	8,17	,04	-1,44472
21	A6	ulangan3	10,55	,03	1,64479
22	A7	ulangan1	13,45	,08	,99723
23	A7	ulangan2	14,51	,03	5,60479
24	A7	ulangan3	8,60	,04	-1,01472
25	A8	ulangan1	12,18	,05	1,85576
26	A8	ulangan2	11,65	,09	-1,51228
27	A8	ulangan3	9,44	,04	-,17472

Data View Variable View

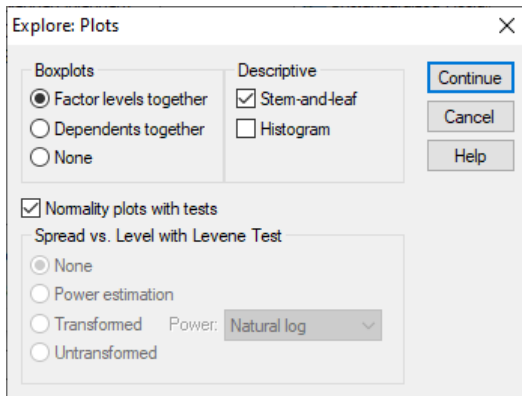
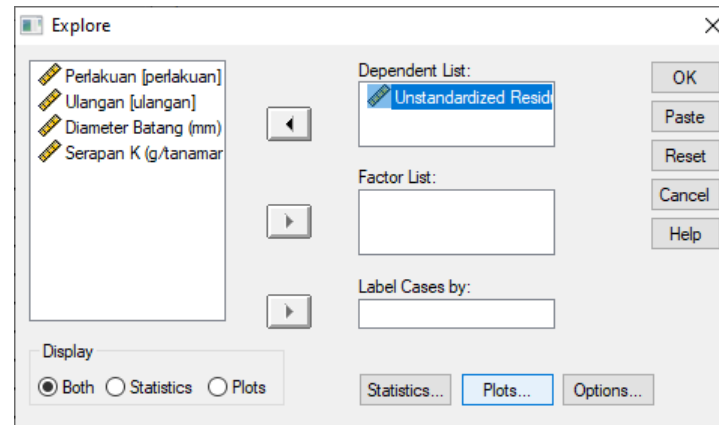
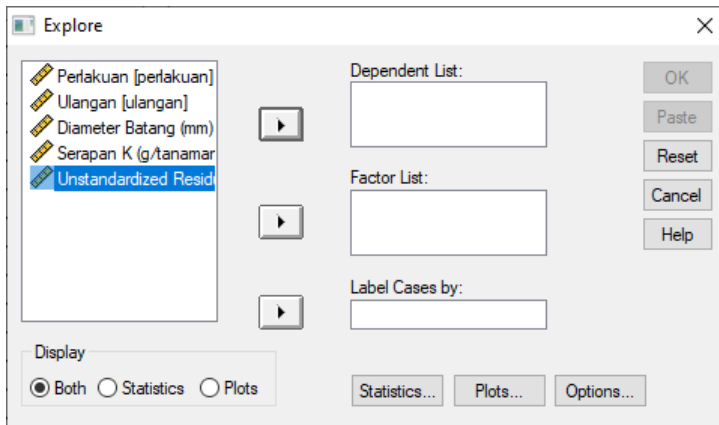
SPSS Processor is ready





# Uji Normalitas Residu

## 2) Analyze > Descriptive Statistics > Explore

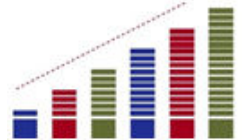


Tests of Normality

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Unstandardized Residual	,124	27	,200*	,956	27	,293

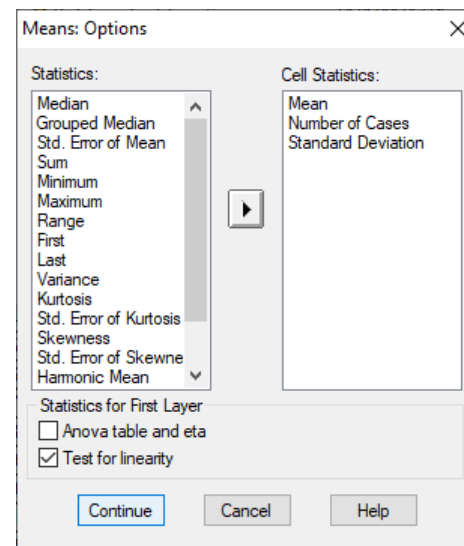
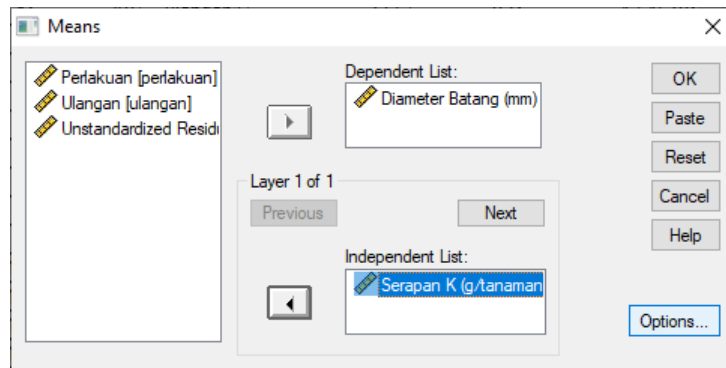
\*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction



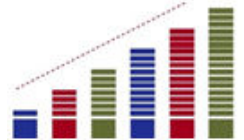
# Uji Linearitas

Analyze > Compare means > Means



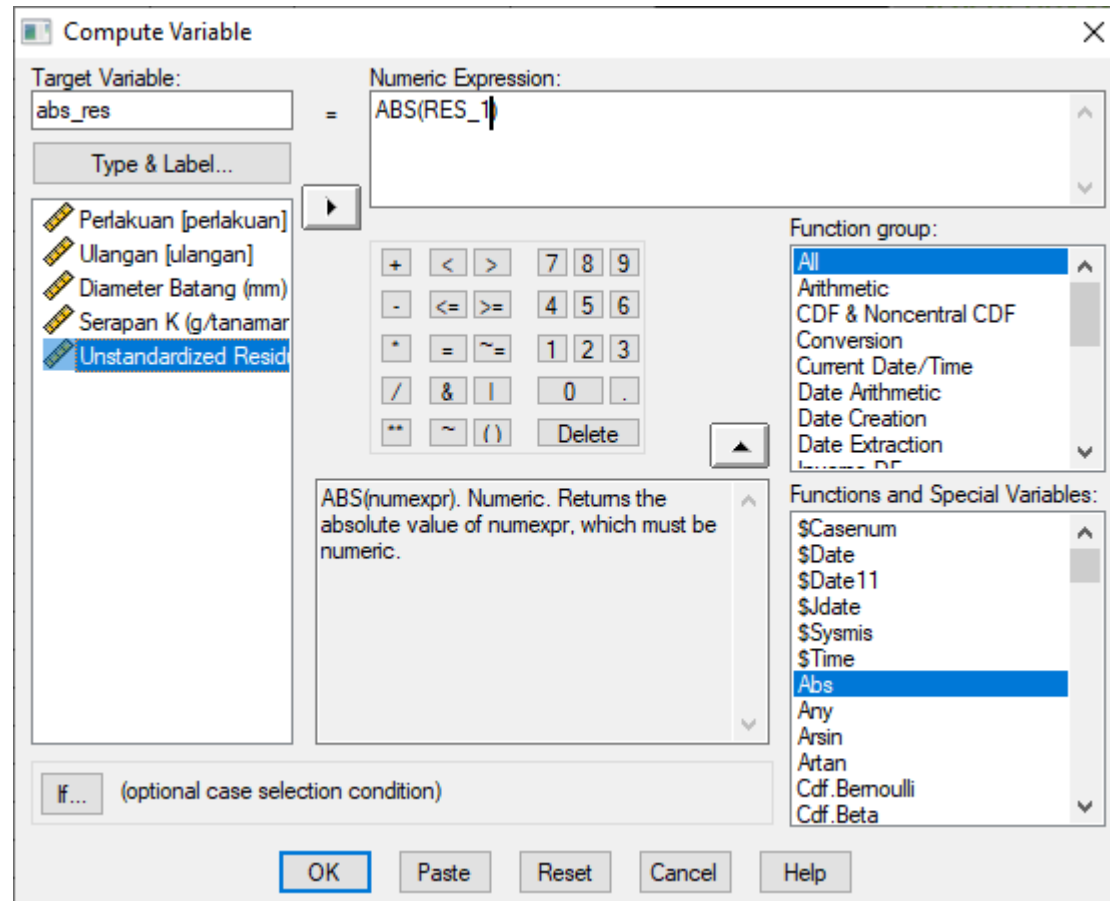
ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Diameter Batang (mm) *	Between Groups	(Combined)	78,648	7	11,235	1,544	,212
Serapan K (g/tanaman)		Linearity	47,358	1	47,358	6,509	,020
		Deviation from Linearity	31,291	6	5,215	,717	,641
	Within Groups		138,246	19	7,276		
	Total		216,895	26			



# Uji Homoskedastisitas (Uji Glesjer)

1) Transform > Compute Variable



\*a gabungan - regresi tunggal.sav [DataSet1] - SPSS Data Editor

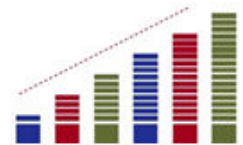
File Edit View Data Transform Analyze Graphs Utilities Window Help

1 : abs\_res 4,54570078740158 Visible: 6 of

	perlakuan	ulangan	diameter_batang	serapan_k	RES_1	abs res
1	A0	ulangan1	3,65	,02	-4,54570	4,55
2	A0	ulangan2	5,20	,01	-2,28619	2,29
3	A0	ulangan3	7,25	,02	-,94570	,95
4	A1	ulangan1	9,39	,05	-,93424	,93
5	A1	ulangan2	7,52	,04	-2,09472	2,09
6	A1	ulangan3	9,55	,04	-,06472	,06
7	A2	ulangan1	9,16	,05	-1,16424	1,16
8	A2	ulangan2	11,19	,04	1,57528	1,58
9	A2	ulangan3	8,24	,04	-1,37472	1,37
10	A3	ulangan1	5,22	,03	-3,68521	3,69
11	A3	ulangan2	12,14	,03	3,23479	3,23
12	A3	ulangan3	7,94	,01	,45381	,45
13	A4	ulangan1	11,88	,04	2,26528	2,27
14	A4	ulangan2	15,17	,03	6,26479	6,26
15	A4	ulangan3	8,50	,04	-1,11472	1,11
16	A5	ulangan1	5,31	,03	-3,59521	3,60
17	A5	ulangan2	9,49	,01	2,00381	2,00
18	A5	ulangan3	8,24	,03	-,66521	,67
19	A6	ulangan1	12,46	,07	,71674	,72
20	A6	ulangan2	8,17	,04	-1,44472	1,44
21	A6	ulangan3	10,55	,03	1,64479	1,64
22	A7	ulangan1	13,45	,08	,99723	1,00
23	A7	ulangan2	14,51	,03	5,60479	5,60
24	A7	ulangan3	8,60	,04	-1,01472	1,01
25	A8	ulangan1	12,18	,05	1,85576	1,86
26	A8	ulangan2	11,65	,09	-1,51228	1,51
27	A8	ulangan3	9,44	,04	-,17472	,17

Data View Variable View

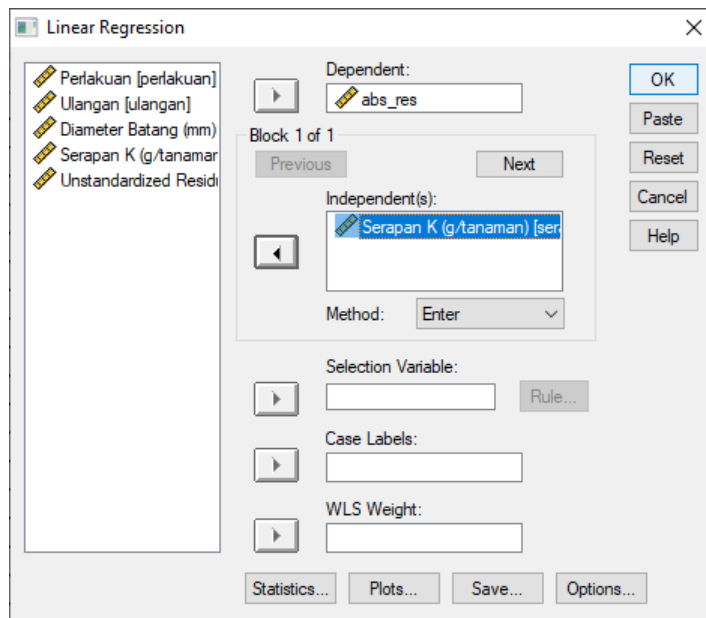
SPSS Processor is ready



# Uji Homoskedastisitas

2) Analyze > Regression > Linear

Sig. Reg. annova > 0,05 artinya tidak terjadi homoskedastisitas

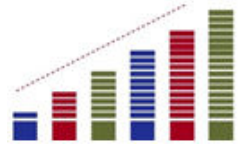


ANOVA<sup>b</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5,332	1	5,332	2,250	,146 <sup>a</sup>
	Residual	59,247	25	2,370		
	Total	64,579	26			

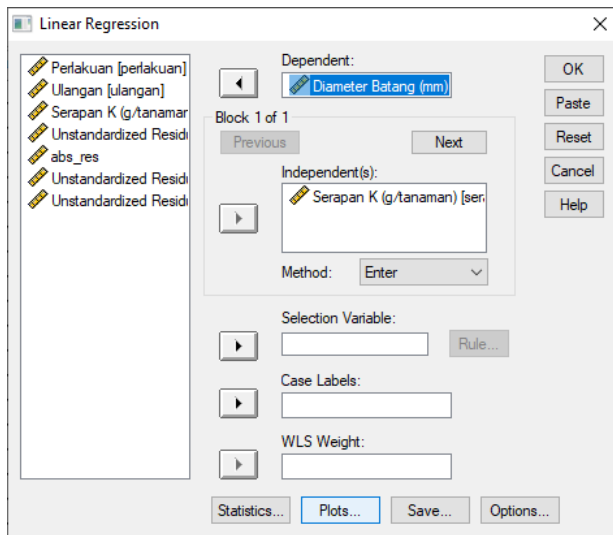
a. Predictors: (Constant), Serapan K (g/tanaman)

b. Dependent Variable: abs\_res



# Uji Homoskedastisitas (Uji Scatterplot)

- 1) Dengan melihat Scatterplot (dalam kasus jika anova nyata, pindah ke metode ini) → Scatterplot tidak teratur/acak artinya tidak terjadi homoskedastisitas → Analyze > Regression > Linear



Linear Regression

Dependent: Diameter Batang (mm)

Block 1 of 1

Independent(s): Serapan K (g/tanaman) [ser]

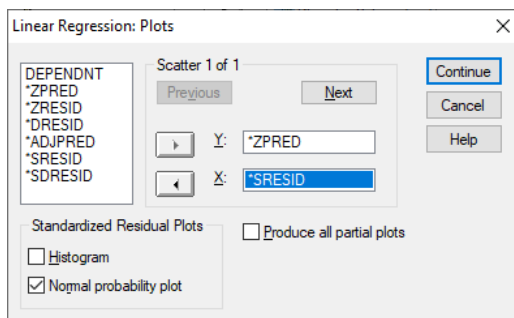
Method: Enter

Selection Variable:

Case Labels:

WLS Weight:

Statistics... Plots... Save... Options...



Linear Regression: Plots

Scatter 1 of 1

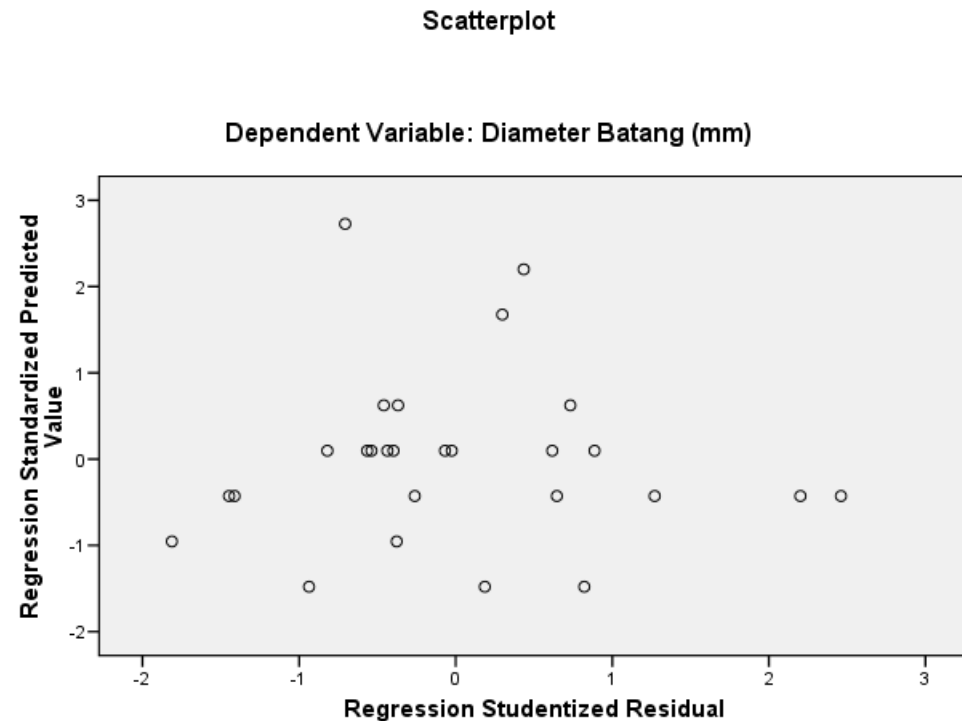
Y: \*ZPRED

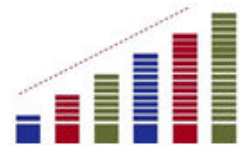
X: \*SRESID

Standardized Residual Plots

Histogram

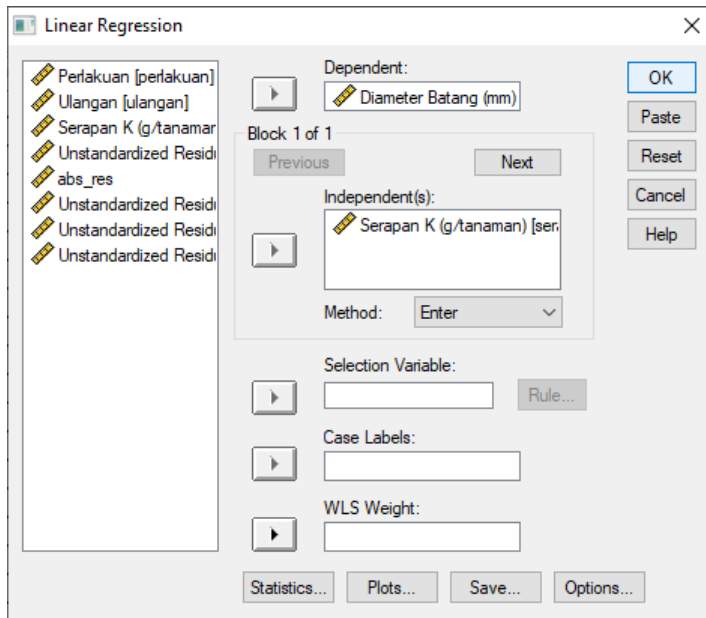
Normal probability plot





# Regresi Linear Tunggal

Analyze > Regression > Linear



**Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,467 <sup>a</sup>	,218	,187	2,60413

a. Predictors: (Constant), Serapan K (g/tanaman)

b. Dependent Variable: Diameter Batang (mm)

**ANOVA<sup>b</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	47,358	1	47,358	6,983	,014 <sup>a</sup>
	Residual	169,537	25	6,781		
	Total	216,895	26			

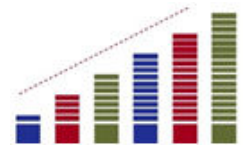
a. Predictors: (Constant), Serapan K (g/tanaman)

b. Dependent Variable: Diameter Batang (mm)

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6,777	1,140		5,943	,000
	Serapan K (g/tanaman)	70,951	26,849	,467	2,643	,014

a. Dependent Variable: Diameter Batang (mm)



# Regresi Linear Tunggal

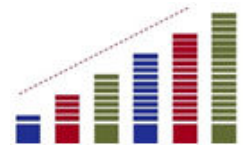
- Persamaan regresi linear:
  - $Y = B \cdot x + C$
  - *Diameter Batang = B \* Serapan K + C*
  - $Y = 70,951x + 6,777$

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	6,777	1,140		5,943	,000
Serapan K (g/tanaman)	70,951	26,849	,467	2,643	,014

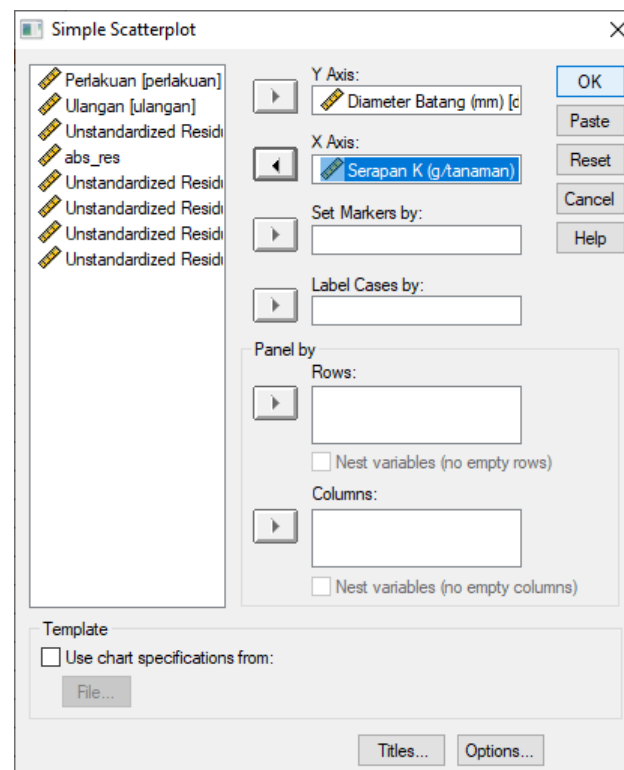
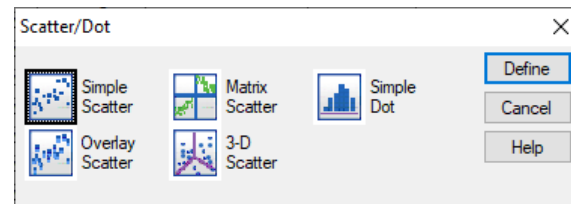
a. Dependent Variable: Diameter Batang (mm)

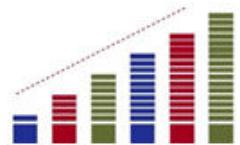




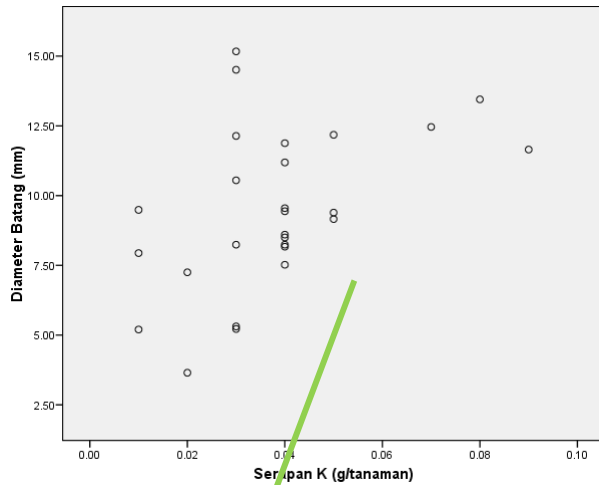
# Grafik Linear

Graphs > Legacy Dialogs > Scatter/Dot

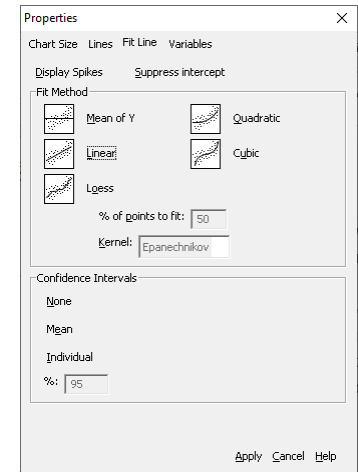
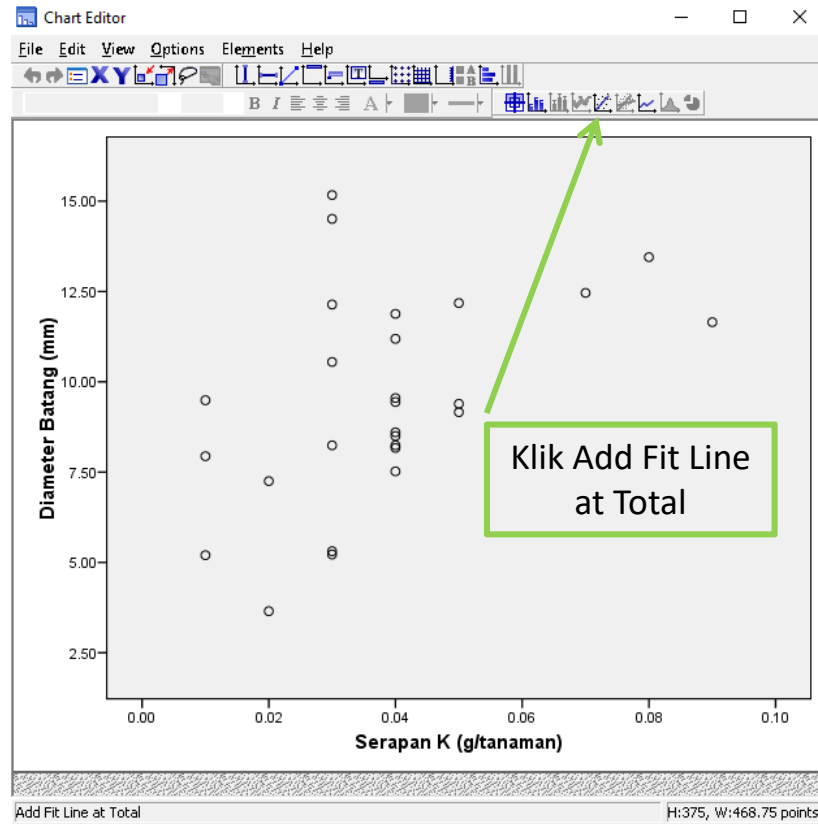


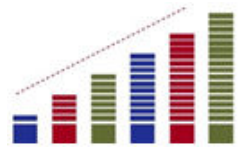


# Grafik Linear

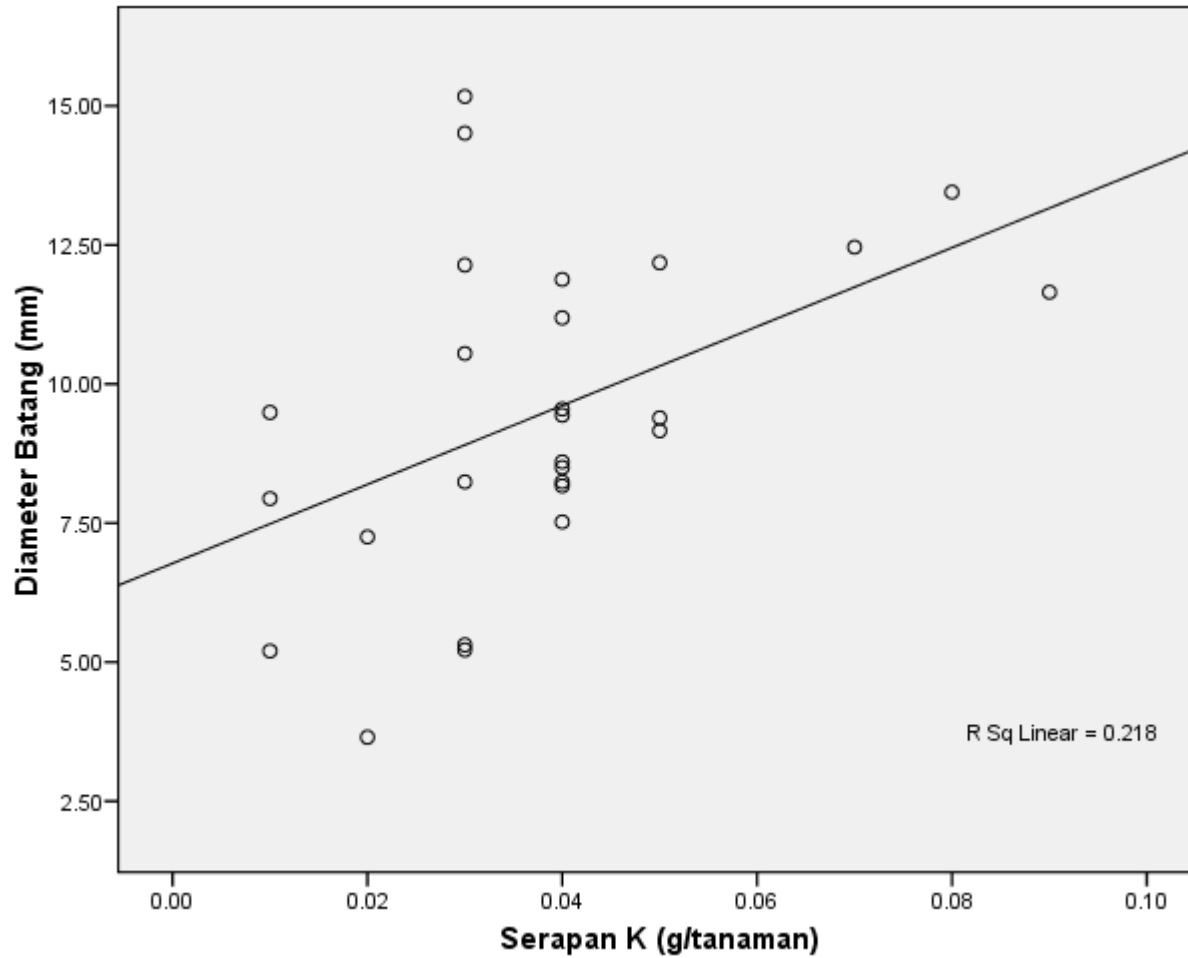


Klik 2 kali pada bidang grafik





# Grafik Linear





# Sampai Jumpa dan Selamat Belajar 😊

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**PERANCANGAN PERCOBAAN – DIYAN HERDIYANTORO 2022**



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0813-2258-1773



<https://herdiyantoro.com>  
<http://labbiotan.faperta.unpad.ac.id>