



Perancangan Percobaan 2

(Regresi dan Korelasi)

KUSWANTO, 2012

SUB POKOK BAHASAN



- Mata kuliah dan SKS
- Manfaat
- Deskripsi
- Tujuan instruksional umum
- Pokok bahasan

MANFAAT MATA KULIAH

- Mata kuliah Perancangan Percobaan II memberikan pengetahuan tentang analisis regresi dan korelasi, sehingga bermanfaat untuk :
 - Mengetahui bentuk hubungan antar dua atau lebih variabel
 - Mengetahui keeratan hubungan antar dua atau lebih variabel

Deskripsi Singkat

- Kuliah diseleksgarakan dalam 14 kali pertemuan (Diskusi, problem solving), tugas terstruktur dan 2 kali ujian selama satu semester.
- Selama tatap muka diberikan wawasan tentang dasar regresi dan korelasi
- Korelasi meliputi korelasi sederhana, korelasi genetik dan pengujiannya
- Regresi meliputi regresi linier sederhana, linier berganda dan non linier
- Pada setiap materi diberikan latihan soal
- Selain tatap muka, juga diberikan praktikum dari beberapa materi pokok.

Tujuan Instruksional Umum

- Pada akhir penyajian mata kuliah ini mahasiswa akan dapat menguasai dengan benar pengertian dasar analisis korelasi dan regresi, serta dapat mengembangkan untuk analisis hasil-hasil penelitian

Pokok Bahasan

1. Model linier
2. Korelasi linier sederhana
3. Regresi linier sederhana
4. Regresi linier berganda
5. Regresi kuadrat, pangkat tiga, tingkat tinggi
6. Regresi logaritma, hiperbola dll
7. Hubungan rancangan percobaan dengan regresi
8. Pendugaan regresi dengan ortogonal polinomial
9. Pendugaan model regresi terbaik
10. Korelasi genetik
11. Analisis lintas

MODEL LINIER

Kuswanto, 2012

Model Linier

- Model Linier (General Linier Model) merupakan analisis statistik yang paling banyak digunakan dalam penelitian terapan dan sosial
- It is the foundation for the t-test, Analysis of Variance (ANOVA), Analysis of Covariance (ANCOVA), regression analysis, and many of the multivariate methods including factor analysis, cluster analysis, multidimensional scaling, discriminant function analysis, canonical correlation, and others.

Model Linier 2 Variabel

- Cara yang paling mudah untuk menggambarkan model linier adalah dengan contoh dua variabel
- Figure 1 shows a bivariate plot of two variables, as a fertilizer (on the x-axis) and a yield of yardlong bean (on the y-axis).
- Each dot on the plot represents the fertilizer and yield score for an individual.
- The pattern clearly shows a positive relationship because, in general, plant with higher fertilizer also have higher yield, and vice versa

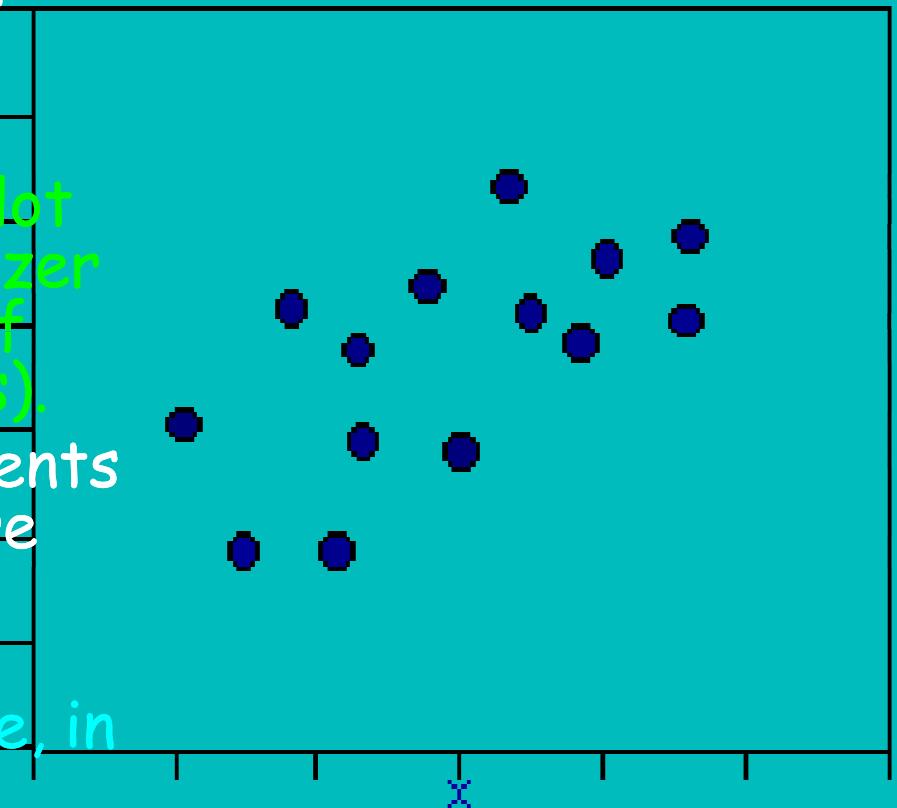


Figure 1. Bivariate plot

Summarize Data

- The goal in our data analysis is to summarize or describe accurately what is happening in the data.
- Dari data pada plot bivariat, bagaimana cara memperoleh "best summarize"?
- Figure 2 shows that a straight line through the "cloud" of data points would effectively describe the pattern in the bivariate plot.

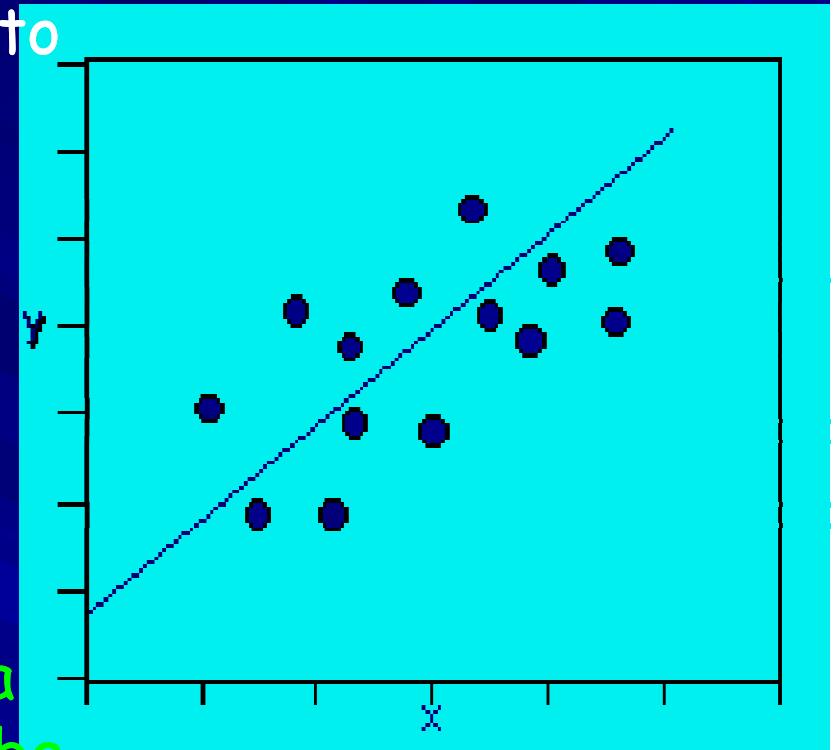
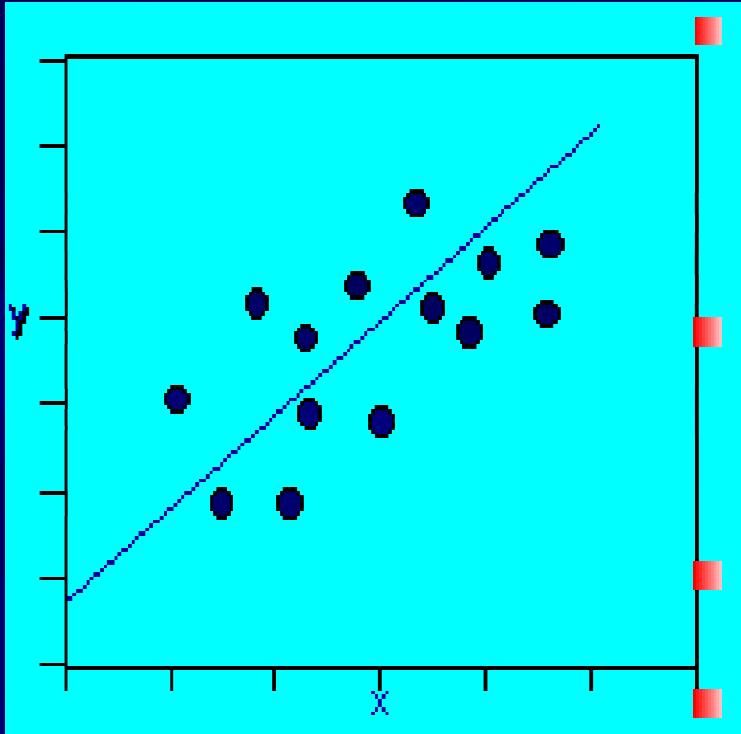


Figure 2. A straight-line summary of the data

Summarize Data



- Although the line does not perfectly describe any specific point (because no point falls precisely on the line), it does accurately describe the pattern in the data.
- When we fit a line to data, we are using what we call a **linear model**. The term "linear" refers to the fact that we are fitting a line.
- The term **model** refers to the equation that summarizes the line that we fit.
- A line like the one shown in Figure 3 is often referred to as a **regression line** and the analysis that produces it is often called **regression analysis**

Figure 3. A straight-line summary of the data

Equation for a straight line

- Figure 4 shows the equation for a straight line.
- You may remember this equation from your high school algebra classes where it is often stated in the form
 - $y = b_0 + b_1x$
- In this equation, the components are:
 - y = the y -axis variable, the outcome or yield of pod
 - x = the x -axis variable, the fertilizer
 - b_0 = the intercept (value of y when $x=0$)
 - b_1 = the slope of the line

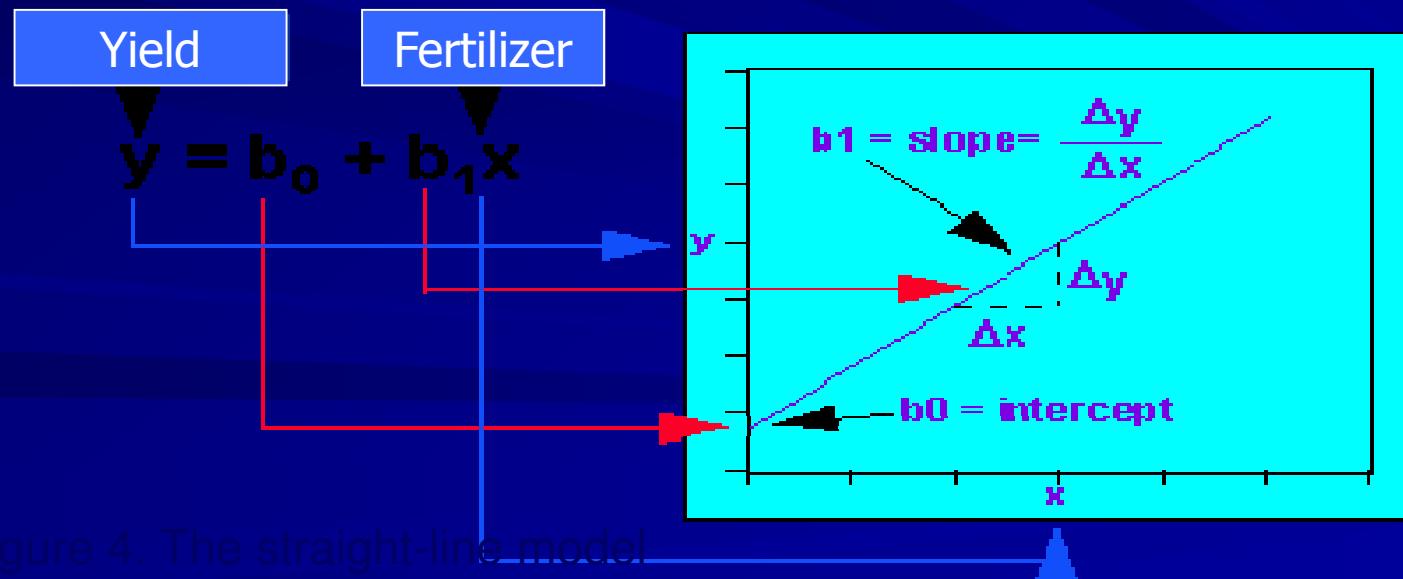
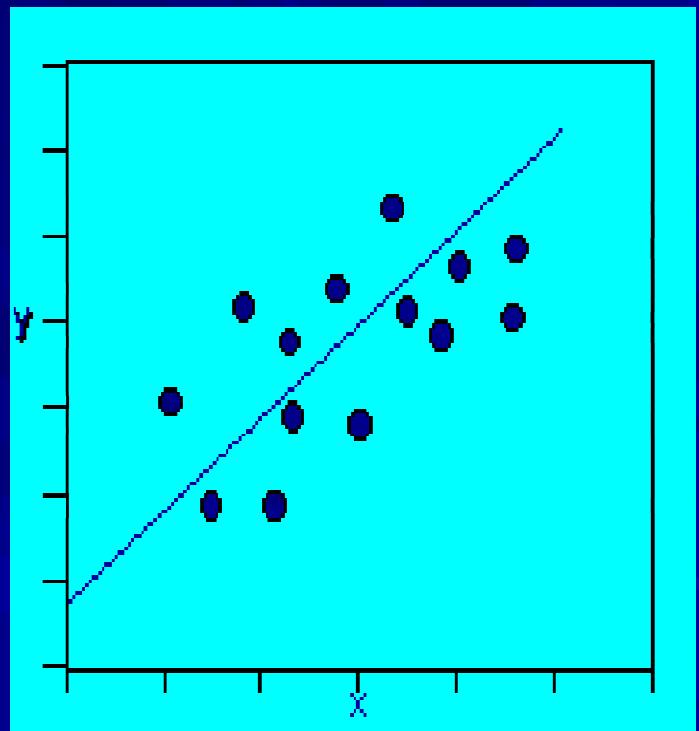


Figure 4. The straight-line model

About the slope (kemiringan)...

- The slope of the line is the change in the yield given in fertilizer units.
- As mentioned above, this equation **does not perfectly fit** the cloud of points in Figure 1.
- If it did, **every point would fall on the line**. We need one more component to describe the way this line is fit to the bivariate plot.



Equation

- Figure 5 shows the equation for the two variable or bivariate linear model.
- The component that we have added to the equation in Figure 5 is an error term, e , that describes the vertical distance from the straight line to each point.
- This term is called "error" because it is the degree to which the line is in error in describing each point.

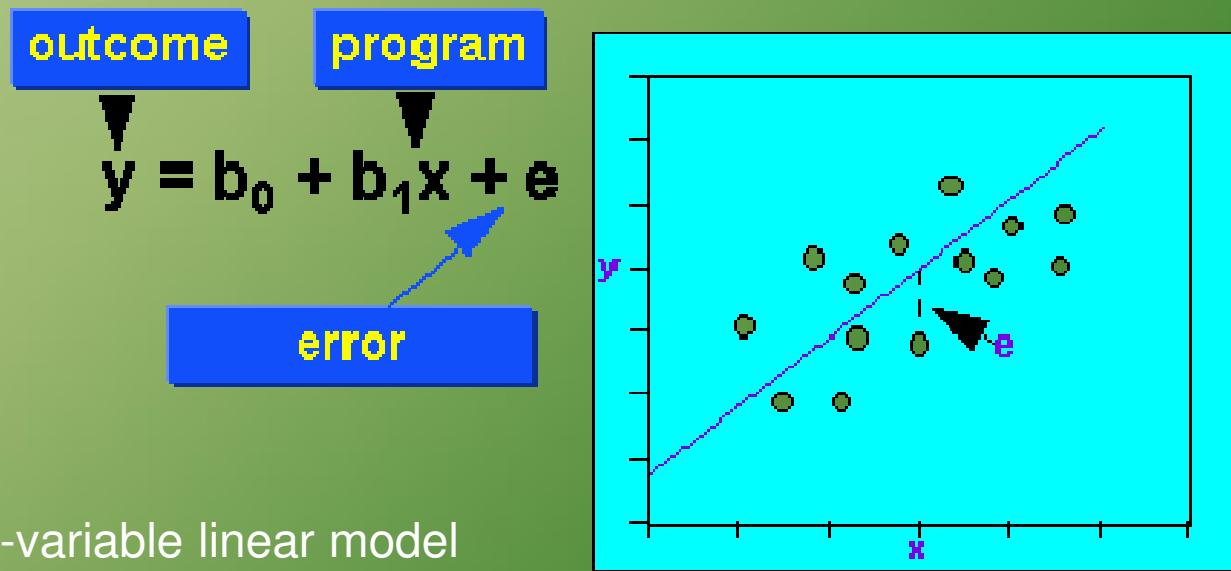


Figure 5. The two-variable linear model

From the equation

$$Y = b_0 + b_1 X + e$$

- When we fit the two-variable linear model to our data, we have an x and y score for each plant in our study.
- We input these value pairs into a computer program.
- The program estimates the b_0 and b_1 values for us as indicated in Figure 6.
- We will actually get two numbers back that are estimates of those two values.

Solve intercept and regression coefficient

$$y = b_0 + b_1 x + e$$

want to solve for

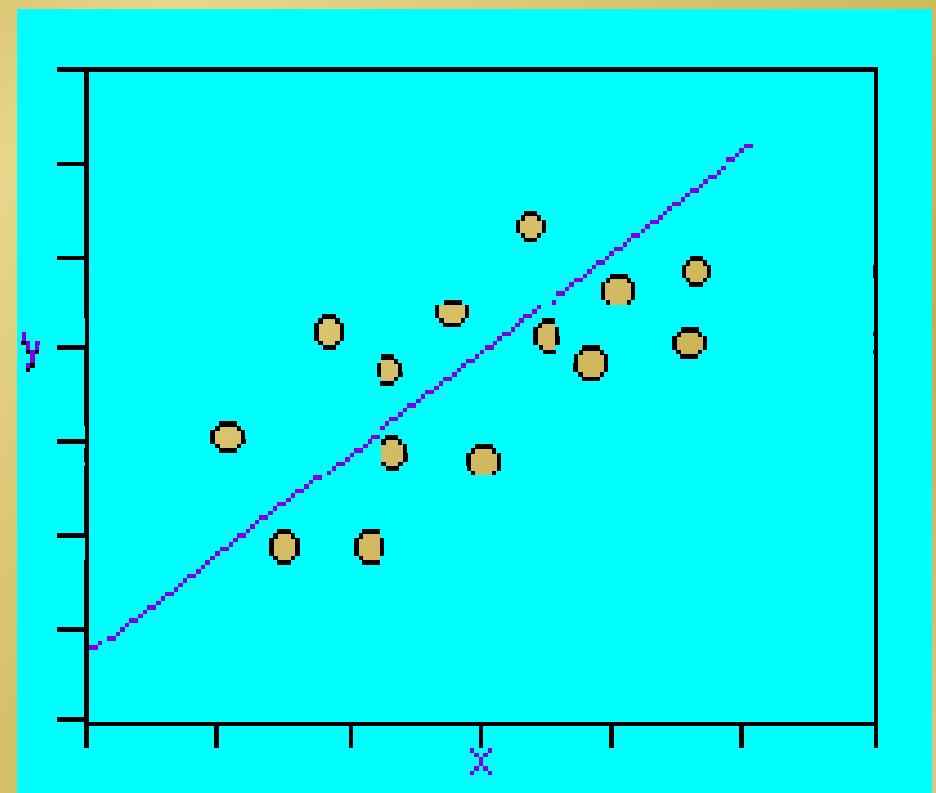
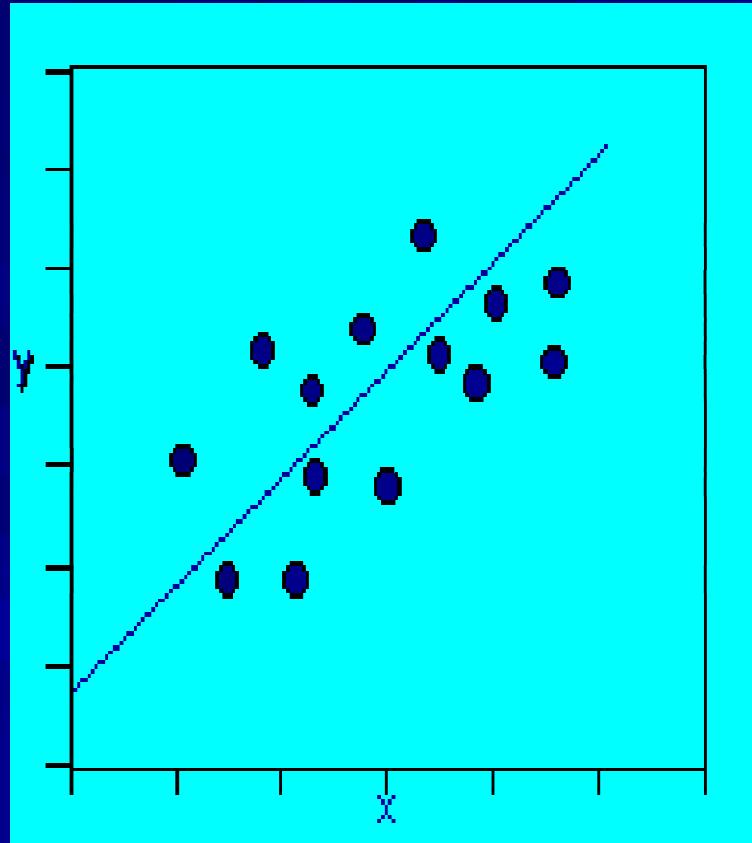


Figure 6. What the model estimates

Dari garis regresi

- Garis regresi 2 variabel tsb, secara sederhana menggambarkan hubungan antara 2 variabel, sebagai rata-rata yang menggambarkan tendensi sentral dari variabel tunggal
- And, just as the mean does not accurately represent every value in a distribution, the regression line does not accurately represent every value in the bivariate distribution.
- Namun, data tsb menunjukkan sebuah pola dan kita dapat menggambarkannya secara ringkas dengan persamaan dan garis



$$Y = b_0 + b_1 X + e$$

Terima kasih