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Chapter 1

Regression analysis is a statistical method for estimating the relationship between a dependent variable (response variable) and one or more independent variables (explanatory variables).

The dependent variable is denoted by Y , and the independent variables are denoted by X_1, X_2, \dots, X_k .

The regression model is written as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + \epsilon$$

where $\beta_0, \beta_1, \beta_2, \dots, \beta_k$ are the regression coefficients, and ϵ is the error term.

The regression model can be estimated using the method of least squares, which minimizes the sum of the squared residuals.

The regression model can be used to predict the value of the dependent variable given the values of the independent variables.

The regression model can also be used to test hypotheses about the relationship between the variables.

(simple regression model)

(multiple regression model)

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- (scatter plot)

1.1