Regression Analysis and Linear Models

Concepts, Applications, and Implementation

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Data files for the examples used in the book and files containing the SPSS and SAS versions of RLM are available on the companion web page at *www.afhayes.com.*

In statistics, linear regression is a linear approach to modelling the relationship between a scalar response and one or more explanatory variables (also known as dependent and independent variables). The case of one explanatory variable is called simple linear regression; for more than one, the process is called multiple linear regression. This term is distinct from multivariate linear regression, where multiple correlated dependent variables are predicted, rather than a single scalar variable. Regression analysis includes several variations, such as linear, multiple linear, and nonlinear. The most common models are simple linear and multiple linear. Nonlinear regression analysis is commonly used for more complicated data sets in which the dependent and independent variables show a nonlinear relationship. Regression analysis offers numerous applications in various disciplines, including finance. Regression Analysis â€“ Linear model assumptions. Linear regression analysis is based on six fundamental assumptions: The dependent and independent variables show a linear relationship between Generally, regression analysis is done for prediction purposes, such that knowing the X parameters you can assume Y parameter which is significantly close to real value. Basically there are two main types of regression : Simple Linear regression. Multiple Linear Regression. Simple Linear Regression defines the relationship between two different variables through a straight line equation which tries to represent the relationship between one dependent and one independent variable. The equation for the simple linear equation is given by: Y=a+bX+u.Â We build this model quite fast right? Letâ€™s make another multiple linear regression model with a different set of features in the X variable. # Preparing the data. X = df[[â€˜LSTATâ€™,â€™INDUSâ€™,â€™CRIMâ€™,â€™NOXâ€™,â€™TAXâ€™,â€™PTRATIOâ€™]]. 10.4 Analysis-of-Variance Models. III. LINEAR-MODEL DIAGNOSTICS. 11. Unusual and Influential Data. 11.1 Outliers, Leverage, and Influence.Â V. extending linear and generalized linear models. 16. Time-Series Regression and Generalized Leasr Squares*. 16.1 Generalized Least-Squares Estimation. 16.2 Serially Correlated Errors. A linear regression model follows a very particular form. In statistics, a regression model is linear when all terms in the model are one of the following: The constant. A parameter multiplied by an independent variable (IV).Â In a different blog post, I use this model to show how to make predictions with regression analysis. It is a linear model that uses a quadratic (squared) term to model the curved relationship. Nonlinear Regression Equations. I showed how linear regression models have one basic configuration. Now, weâ€™ll focus on the â€œnonâ€ in nonlinear! If a regression equation doesnâ€™t follow the rules for a linear model, then it must be a nonlinear model. Itâ€™s that simple! A nonlinear model is literally not linear.