

General Linear Model

The general linear model (or GLM) is a statistical linear model in which a continuous response variable (or dependent variable) Y is regressed on one or more predictor variables (or independent variables) X . In other words, the response Y is modeled as a linear function of predictor (X) variables.

The general linear model can be written as $Y = X\beta + \epsilon$. In this notation, Y is a vector of continuous response measurements—in other words, Y is a set of response values that consists of one response for each observation in the data. X represents a matrix of predictor variables. β is a vector of model parameters, which are usually estimated. ϵ is a vector of random errors.

Although this model has multiple predictors, it is not a multivariate analysis. It has only one response variable to model, so it is a univariate analysis. General linear models are often classified according to the types of predictor variables that they include. Ordinary least squares (or OLS) regression models the relationship between a continuous response variable and continuous predictor variables. ANOVA (analysis of variance) models the relationship between a continuous response variable and categorical predictor variables. Finally, ANCOVA (analysis of covariance) models the relationship between a continuous response variable and a set of variables consisting of both types: continuous and categorical.