GLM

Generalized Linear Model

Main models
Examples

Left (Y) continuous

Y = Income

ANOVA

right: categorical

$$\text{Income} = \mu + \text{Sex} + \text{Edu} + \text{Sex} \cdot \text{Edu}$$

ANCOVA

right: mixed

$$\text{Income} = \mu + \text{Sex} + \text{Edu} + \text{Sex} \cdot \text{Edu} + ß_1 \cdot \text{Age}$$

Regression

right: continuous (+dummy variables)

$$\text{Income} = \mu + ß_1 \cdot \text{Age} + ß_2 \cdot \text{NChildren} + ß_3 \cdot \text{Male}$$

Left (Y) categorical

Y = Survive heart surgery

π=Prob(Survived)

Logistic Regression

right: mixed

$$\ln\left(\frac{\pi}{1-\pi}\right) = ß_0 + ß_1 \cdot \text{Sex} + ß_2 \cdot \text{Age}$$

Probit-Analysis

right: mixed

$$\Phi^{-1}(\pi) = ß_0 + ß_1 \cdot \text{Sex} + ß_2 \cdot \text{Age}$$

Left (Y) counts

Y = Frequency in a crosstable

μ:= Expected Frequency

Loglinear model

right: categorical

$$\ln(\mu) = \mu_0 + \lambda_{\text{Sex}} + \lambda_{\text{Edu}} + \lambda_{\text{Sex*Edu}}$$

Y = Number of insurance claims

μ:=Expected Counts

Poisson Regression = Poisson Loglinear Model

right: mixed

$$\ln(\mu) = ß_0 + ß_1 \cdot \text{TypeOfCar} + ß_2 \cdot \text{AgeDriver}$$