

Multiple Linear Regression.

explanatory r.v.s/predictors: $(x_1, x_2, \dots, x_p)^T =: X$

response r.v. Y

In general: $Y = f(X) + \epsilon$ w/ X and ϵ are
 $\epsilon \sim N(0, \sigma^2)$ *independent*

Multiple linear regression:

$$Y = \beta_0 \cdot 1 + \underbrace{\beta_1 x_1 + \beta_2 x_2 + \dots + \beta_p x_p}_{\beta \cdot X} + \epsilon$$

← "fake predictor"

eq'n for a p -dimensional
(hyper)plane in a $(p+1)$ -dimensional
space

$f(x)$

However, with interaction terms:

e.g., $Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 \underbrace{x_1 x_2}_{\text{interaction}} + \epsilon$