

# Interaction regression models

# What is an additive model?

A regression model with  $p-1$  predictor variables contains **additive effects** if the response function can be written as a sum of functions of the predictor variables:

$$E(\mathbf{Y}) = f_1(\mathbf{X}_1) + f_2(\mathbf{X}_2) + \dots + f_{p-1}(\mathbf{X}_{p-1})$$

For example:

$$E(\mathbf{Y}) = (\beta_0 + \beta_1 \mathbf{X}_1 + \beta_{11} \mathbf{X}_1^2) + (\beta_2 \mathbf{X}_2)$$

$$E(Y) = 10 + 2X_1 + 3X_2$$

