Polynomial Regression Models

in general, polynomial models are of the form

$$Y = \beta_0 + \beta_1 X + \beta_2 X^2 + \beta_3 X^3 + \cdots\cdots + \beta_n X^n + \epsilon$$

where d is called the **degree** of the polynomial

- non-linear relationship between predictors and response captured by polynomial terms but model remains linear in the parameters
- example: model can be written as

  $$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon$$

  where $X_1 = X$, $X_2 = X^2$, $X_3 = X^3$
- we can use LS for estimation

Polynomial Regression Models: Choosing d