Generalized Additive Models (GAMs)

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GAMs provide a general framework for extending a standard linear model: allowing non-linear functions of each of the variables, while maintaining additivity

$$Y = \beta_0 + f(X_1) + f(X_2) + f(X_3) + \cdots + f_p(X_p) + \epsilon$$

each linear component $\beta_j X_j$ can be replaced by smooth non-linear function $f_j(X_j)$

For example, a GAM may include

- non-linear polynomial method for continuous predictors
- step functions which are more appropriate for categorical predictors
- linear models if that seems more appropriate for some predictors