

**Chiou, Jeng-Min; Müller, Hans-Georg; Wang, Jane-Ling**

**Functional response models.** (English) Zbl 1073.62098

Stat. Sin. 14, No. 3, 675-693 (2004).

**Summary:** We review functional regression models and discuss in more detail the situation where the predictor is a vector or scalar, such as a dose, and the response is a random trajectory. These models incorporate the influence of the predictor either through the mean response function, through the random components of a Karhunen-Loève or functional principal components expansion, or by means of a combination of both.

In a case study, we analyze dose-response data with functional responses from an experiment on the age-specific reproduction of medflies. Daily egg-laying was recorded for a sample of 874 medflies in response to dietary dose provided to the flies. We compare several functional response models for these data. A useful criterion to evaluate models is a model's ability to predict the response at a new dose. We quantify this notion by means of a conditional prediction error that is obtained through a leave-one-dose-out technique.

**MSC:**

**62P10** Applications of statistics to biology and medical sciences; meta analysis

Cited in **34** Documents

**62M10** Time series, auto-correlation, regression, etc. in statistics (GARCH)

**62J02** General nonlinear regression

**62M20** Inference from stochastic processes and prediction

**Keywords:**

dose response; eigenfunctions; functional data analysis; functional regression; multiplicative modeling; principal components; smoothing