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A functional multiplicative effects model for longitudinal data, with application to reproductive histories of female medflies. (English) [Zbl 1034.62097](#)

Stat. Sin. 13, No. 4, 1119-1133 (2003).

Summary: We investigate the fitting of response curves in the presence of a continuous covariate. A model is presented in which the expected random response curves, viewed as functions of time and conditional on the covariate, are products of a smooth mean function of time and a smooth function of the covariate. We propose a simple and straightforward estimation scheme for the component functions of the product, and provide basic consistency results for the estimates of the model components.

This functional multiplicative effects model for longitudinal data is compared with an unrestricted non-parametric smooth surface model. In an application to the egg-laying behavior of 936 female medflies, the shape of the egg-laying curves is related to the total number of eggs laid by an individual fly. This sheds light on how reproduction intensity is regulated at the individual level. The proposed multiplicative effects model is compared with an unrestricted multivariate smoothing approach.

MSC:

[62N02](#) Estimation in survival analysis and censored data

[62P10](#) Applications of statistics to biology and medical sciences; meta analysis

[62G05](#) Nonparametric estimation

Cited in **13** Documents

Keywords:

fecundity; functional regression; longitudinal data; response curves; smoothing