DYNAMIC LINEAR MODELS FOR INFORMATIVELY CENSORED LONGITUDINAL DATA

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We propose linear models for the increments of a longitudinal response. These models are shown to be particularly useful in cases where the longitudinal process is censored, possibly for reasons connected to the response itself. Under fairly weak conditions on the dropout mechanism, we provide essentially unbiased nonparametric estimators for the effects of covariate processes on the longitudinal response. The properties of these estimators are readily derived using the body of results associated with discrete stochastic calculus. In particular, formulating random effects — that is, unpredictable heterogeneiety — as martingale processes is a natural and general assumption, of which standard models such as random walk, slope and intercept are shown to be special cases. Importantly, estimation and inference may be rapidly carried out using standard statistical software; we illustrate methodology and implementation with reference to a number of applications in medical science.