

Robust semiparametric models for time-dependent longitudinal data

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Abstract: Longitudinal data can sometimes be seen as discrete observations of a continuous-time stochastic process. In those cases, it is of interest to estimate the mean and the covariance function (or the principal components) of the process. The most commonly used estimators are very sensitive to outliers, of which there are two types: isolated atypical observations within trajectories or whole outlying trajectories. Here we propose a semiparametric Student's t model for the mean and principal components of the process, and show that the resulting maximum likelihood estimators are resistant to both types of outliers. The estimators can be easily computed with a EM algorithm. As an example, we apply the proposed method to CD4-count trajectories of AIDS patients.