Efficient Empirical Likelihood Inference in Partial Linear Single-index Models for Longitudinal Data

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In analyzing longitudinal data, within-subject correlations are a major factor that affects statistical efficiency. Working with a partially linear single-index model for longitudinal data, we consider a subject-wise empirical likelihood based method that takes the within-subject correlations into consideration to estimate the model parameters efficiently. A nonparametric version of the Wilks theorem for the limiting distribution of the empirical likelihood ratio, which relies on a kernel regression smoothing method to properly center data, is derived. On the other hand, counter-intuitively, adjusting for within-subject correlations is unnecessary when estimating the nonparametric baseline function. Also we discuss the covariance estimation. A simulation study and an application are reported to investigate the finite sample properties of the proposed method and compare it with the block empirical likelihood method and the normal approximation. These numerical results demonstrate the usefulness of the proposed method.