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# Empirical likelihood semiparametric nonlinear regression analysis for longitudinal data with responses missing at random

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**Abstract** This paper develops the empirical likelihood (EL) inference on parameters and baseline function in a semiparametric nonlinear regression model for longitudinal data in the presence of missing response variables. We propose two EL-based ratio statistics for regression coefficients by introducing the working covariance matrix and a residual-adjusted EL ratio statistic for baseline function. We establish asymptotic properties of the EL estimators for regression coefficients and baseline function. Simulation studies are used to investigate the finite sample performance of our proposed EL methodologies. An AIDS clinical trial data set is used to illustrate our proposed methodologies.

**Keywords** Empirical likelihood · Imputation · Longitudinal data · Missing at random · Semiparametric nonlinear regression model