Functional Mixed Effects model for joint analysis of longitudinal and cross-sectional growth data

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Abstract: A new method is proposed to perform joint analysis of longitudinal and cross-sectional growth data to improve the efficiency of the estimates. Clustering is first performed to group similar subjects in cross-sectional data to form a pseudo longitudinal data set, then the pseudo longitudinal data and real longitudinal data are combined and analyzed by using a functional mixed effects model. To account for the variational difference between pseudo and real longitudinal growth data, it is assumed that the covariance functions of the random effects and the variance functions of the measurement errors for pseudo and real longitudinal data can be different. Various simulation studies and real data analysis demonstrate the good performance of the method.