Summary measures and random coefficients models

Julia Volaufova and Lynn R. LaMotte

Biostatistics Program, LSUHSC School of Public Health, New Orleans, USA

Abstract

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In many biomedical experiments one or more variables are observed repeatedly, mostly over certain time intervals, on independent sampling units (subjects), which are randomly assigned into several treatment groups. Most of the time the research question is, whether the relationship between the response variable(s) and time or between the different response variables differs among treatment groups. This setting is routinely modeled by a random coefficients model and the techniques of (linear) mixed models are applied to address the primary aim. An alternative approach is, for each subject to obtain a *summary measure* vector, which characterizes the relationship in question, and test for equality of means of that random vector among treatment groups. Here we study the relationship between the two approaches in some simple settings. We present a brief overview of existing practices in growth curve models (random coefficients models) and compare the statistical properties of tests by simulation.