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Abstract: A new estimation procedure is proposed for estimating the parameters of the simplest pharmacokinetic model, the one-compartment open model. This ordered simultaneous estimation procedure (OSEP) is less sensitive to outliers than classical least squares. General empirical information comparing the sample moments of the estimates derived by OSEP with those of least squares is also presented. In general, the OSEP technique performs better when the model is known, and outliers are known to exist. However, when it is desired to fit all the data, least squares is the better choice. The extension of the technique to other similar models is attractive, but the dependence of the OSEP estimates on the model and domain partition has not been investigated. OSEP can be used as an adjunct to least squares in the one-compartment open model, and has the additional advantage of being more adaptable to small computers than most nonlinear least-squares routines.

Sample data with anomalies for a one compartment model are given with demonstrations as to how to estimate parameters.

Keywords: nonlinear estimation, one compartment model, pharmacokinetics, parameter estimation