Inference for General Random Effects Models

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Abstract

This thesis describes methods associated with general random effects models. It is divided into two parts. Part one describes a technique for investigating mean-variance relationships in random effects models. A simple one-way random effects model is proposed as a basis for deriving a score test for homogeneity of variance in one-way random effects models. An arbitrary mean-variance relationship is captured by a single parameter which allows for the possibility of detecting situations where the variance changes systematically with the mean. Part two derives an approximation to the likelihood function using a Laplace expansion to the fourth order. This approximation may be applied to general models with multiple crossed and/or nested effects. The score test of homogeneity and the approximate likelihood function are examined using simulations and simple data analyses.

Declaration

This work contains no material which has been accepted for the award of any other degree or diploma in any University or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text.

I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

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No animals were harmed throughout the making of this thesis.