**Maximum Likelihood Estimation of Two Variance Components in a Random Effects Model**

**Model**

**Likelihood Function**

Let be the eigenvalue decomposition of G, where is a matrix with eigenvectors, satisfying and is a diagonal matrix with the eigenvalues of G in the diagonal. Using and we have

Further, using and

where: .

Furthermore, the determinant of is simply the product of it’s eigenvalues, therefore,

Combining the above results we have

Therefore, becomes,

=

where: .