An R function getVcEDF() was developed for improving the estimates of the variance components and generating the effective degrees of freedom (EDF). This function improves the estimation of the variance components by using the restricted maximum likelihood (REML) technique. The EDF is used to assess the effectiveness of the improved estimates.

The function getVcEDF()consists of three steps. The first step constructs the Fisher’s information matrix using the MS and DF extracted from an ANOVA table. The second step obtains the G matrix, which is used for changing the variables of interest. The last step is to improve the variance component estimates and to compute the EDF.

As mentioned, the first part of getFcEDF() constructs the Fisher’s information matrix. In order to do this, it is necessary to extract the MS and DF from an ANOVA table. Normally, the basic R function aov() can be used to generate an ANOVA table, however, because the aov() function only implements a single stage of decomposition, this cannot be applied directly to two-phase experiments. Two-phase experiments require two stages of decomposition; decomposition of the information from the Phase 1 block structure in the Phase 2 bock structure, and decomposition the information from the treatment structure in the Phase 1 block structure. Based on this idea of two stages of decomposition the aov() function can be applied twice, i.e. once for each stage of decomposition. The summary.aov.twoPhase() function from the infoDecompuTE package which implements the two stages of decomposition as described above, is therefore used to generate the ANOVA table.

The fisher’s information matrix is then constructed by extracting the DF and DF from the ANOVA table. The appendix shows…