Assignment 10

1. Read the documentation on REMLF90, and read Readme file in directory aireml.

2. Look at file remlf90.f90. Identify parts computing the inverse, calculating traces and quadratic forms for the random effects and for the residuals.

3. Calculate estimates of variance components by remlf90 and airemlf90 using the parameter file exmr99s1. Record the number of rounds and CPU time. Extend the model to 2 traits by adding the observations in column 4 (parameter file exmr99s2). Repeat the computations for AIREMLF90 only. How much slower is REMLF90 and how longer are the computations in the two-trait case?

4. Change variances in parameter file exmr99s1 to very small values (approximately 10 times smaller than now) and very large values (10 times bigger). Check convergence of REMLF90 and AIREMLF90.

Optional

5. The data file that is used in parameter files exmr99* contains data fields for 14 traits. Try extending the number of traits in analyses beyond 3. At what number of traits is the algorithm becoming unstable? For a number of traits that it starts to be unstable, try REMLF90.

6. Convert REMLF90 to using the faster single-trait formula for the variance components, as described in the notes. Compare its efficiency for exmr99s1 and exmr99s2.

Running programs with a larger number of traits can be done in groups so as not to overload the computer.