

Outline of the BLUPF90 course: Genomic analyses using BLUPF90

Daniela Lourenco February 2-4, 2022

Time: from 9:00 AM – 12:00 PM and from 2:00 PM – 5:00 PM

Feb 2:

1. Introduction to BLUPF90 family of programs
 - a) Renumbering datasets
 - b) Mixed models
 - c) Multiple trait model
 - d) Repeatability models
2. BLUPF90 family of programs for variance components estimation
 - a) REML and AIREML
 - b) Gibbs Sampling for linear and categorical traits
3. Exercises: use of programs for datasets with single and multiple traits

Feb 3:

1. Introduction to genomics
2. Genomic relationship matrix (\mathbf{G})
3. Theory of single-step GBLUP (ssGBLUP)
4. Quality control of SNP data and genomic and pedigree relationships
5. Creation and handling of genomic relationship matrices with preGSf90
6. Use of external matrices
7. GBLUP, GREML and GGIBBBS using BLUPF90
8. Exercises: use of genomic programs with real data

Feb 4:

1. Accounting for unknown relationships in ssGBLUP (UPG and metafounders)
2. Estimating SNP effects from GBLUP-based models
3. Weighted GBLUP and ssGBLUP
4. Genome-wide association (GWA)
 - a. Percentage of variance explained
 - b. P-values
5. Exercises: Application of weighted ssGBLUP and GWA