

Assignment 9

Create a directory f90 and download file progsf90.tar.gz. This file is available at <http://nce.ads.uga.edu/~ignacy/newprograms.html>, by clicking on “package”. Uncompress this file:

```
tar xzvf progsf90.tar.gz
```

Then compile all the libraries and programs:

```
make linux-intel
make all
```

Each program has its own directory and its own Makefile. To recompile any program separately, go to its directory and type

```
make
```

For Windows installation, see the end of this page.

1. Read:

- a) Readme, Installation, and Makefile files in the main directory,
- b) Readme in directory libs. Identify programs that implement reading the parameters, sparse matrix factorization, and hash function.

2. Run blupf90 with examples specified in Appendices A-C with 3 solving options:

- a) by default iteration (PCG),
- b) by Gauss-Seidel iteration,
- c) by FSPAK.

For details how to change the solving options, see blupf90.f90 and readme.blupf90 in the blupf90 directory. Also look at other examples. The parameter files start or end with letters ex. Examples are stored in the directory examples.

3. Prepare parameter file for a data set used with an assignment for lsq.f90 and run blupf90.

Optional

3. Modify blupf90.f90 so that it calculates accuracies for the animal effect. Accuracies for an animal in equation i in a single-trait situation is defined as:

$$1 - \text{LHS}^{ii} / \sigma_a^2$$

where LHS^{ii} is the i -th diagonal of the inverse of the left hand side.

Suggestion: Invert by FSPAK and obtain elements of the inverse by function “getm” from module sparsem.

Windows installation

This installation requires files tar.exe and gzip.exe. They can be found at <http://nce.ads.uga.edu/~ignacy/newprograms.html> under “Windows executables”.

To install the programs:

- create new subdirectory,
- copy progsf90.tar.gz to that subdirectory
- type:

```
gzip -d progsf90.tar.gz
tar xvf progsf90.tar
```

To install BAT files for a LAHEY compiler and then compile the library and program blupf90, type:

```
tar xvf makelahey.tar
cd libs
makefile
cd ..
cd blup
makefile
```

Binaries for Windows including package GNUPLOT available in directory zs6; read Readme.zs6.

Optional

4. Consider the data set:

herd	animal	birth weight	weaning weight
1	1	35	150
1	2	40	165
2	3	42	-
2	4	-	170

with the pedigree:

animal	sire	dam
1	5	7
2	5	8
3	5	7
4	6	8
5	-	-
6	-	-
7	-	-
8	-	-

Prepare parameter files for the following models:

- for birth weight with herd and animal effects,
- as above plus maternal effect,
- as above but for two traits.

Assume that all variances are 100 and all covariances are 10.