VCE - Variance Component Estimation

Introduction

VCE is a program to estimate covariance matrices in a rather general manner.

Two methods are available:

- REML using analytical gradients,
- Gibbs sampling.

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Software

VCE Features

- VCE is completely rewritten in Fortran90

- comes as executables ready to run

- controlled by intuitive parameter file

- sports two methods:

  - does REML optimization with a quasi-Newton procedure using analytical gradients (AG) (i.e. exact first derivatives based on the sparse inverse)
  - estimates (co)variance components with Gibbs sampling (GI)

- very flexible model definition such as:

  - animal model
  - sire model
  - repeatability model
  - maternal effects model (correlated random effects)

- inbreeding considered as a default

- genetic groups (phantom parents)

- restart facility after abort

- starting values can override the defaults

- multiple trait

- different model for each trait

- random regression models

- dominance models

- optimization ensured to stay within the parameter space

- no built in limit regarding number of traits, effects (fixed and random), regression which can be nested in another fixed effect

- automatic reparameterization of rank deficient models to full rank models based on the Cholesky factorization

- listing of dependent equations

Documentation

Introduction

Here is some documentation for you:

Install Binaries

The installation of the binaries

If you want to install VCE on a machine you simply need to select the corresponding binary that runs on your platform. For instance, if you own a 64-bit machine running Linux you need to ftp the Linux_x86_64 binary.

Always download the latest version! Identify the binary in directory vce6/bin that is appropriate for your computer. Thus, if you use a Linux machine on Intel 32 bit hardware, vce-Linux-x86_32-fortran-6.0.2 is for you. This will also run on 64 bit hardware at exactly the same speed as the 64 version (vce-Linux-x86_64)-gfortran-6.0.2 .
The only advantage of the latter is, that more than 3GB of RAM can be accessed in one VCE run.

If you work on a (yet) not supported platform and have a Fortran90 compiler please get in contact with me (email: Eildert.Groeneveld@gmx.de (mailto:Eildert.Groeneveld@gmx.de)).

The bin directory on the ftp server holds something like the following entries:

```
       vce-Linux-ARM-gfortran-6.0.2
       vce-Linux-x86_32-gfortran-6.0.2
       vce-Linux-x86_64-gfortran-6.0.2
       vce-MacOS-x86_32-gfortran-6.0.2
       vce-Windows-x86_32-gfortran-6.0.2.exe
```

Remember to always pick the latest version, i.e. the one with the highest release number!

You should move the file to a position in the file system where every user has read access and that is also in the search path. On UNIX systems a logical place would be /usr/local/bin. If you do not have root access ask your system administrator.
Next you may want to make a link to the generic name vce:

```
  ln -s vce-Linux-x86_64-gfortran-6.0.2    vce6
```

Now you should have the binary vce. You can test immediately if the binaries run on your machine by invoking:

```
  vce6
    ***********************************************
    *                    VCE-6                                  *
    *                 version 6.0.2                          *
    *              05-Nov-2008 @ 09:16:31             *
    *            Linux-x86_64-gfortran                  *
    *                 written by                           *
    *        Milena Kovac, Eildert Groeneveld        *
    *           and Alberto Garcia-Cortez            *

    ***********************************************
  VCE [help] pfile funk
```

Then you should be in business.

Running some test examples

Installation of the examples

Preferably in the user space create a directory vce6 (or whatever name you choose).

```
  mkdir vce6
```

Download the examples archive to that directory.
Go to that directory:

```
  cd vce6
```

Unpack the archive:

```
tar -xzf vce-examples.tgz
```

This will create the directory test with the following sub directories:

```
data/
 master_pfile/
 temp/
 verified/
 verified_long/
```

Go to directory temp and run your first vce job:

```
cd temp
vce6 ../master_pfile/np01
```

Then vce will spit out the run log and also create a log file.
If however you get something like:

```
bash: vce6: command not found
```

Then you have not set your search path correctly. Ask you system administrator
if you do not know how to do that.

Reading the fine manual

RTFM

Get a pdf-file of the VCE6 manual either in A4 or Letter format at the Download section
or here.

Getting further help

At the FLI Institute in Mariensee we have set up a mailing list through which vce and pest
users can ask for support in case of questions.

Because of the ever increasing spam mails you will have to subscribe here.

Available ports

Currently we can provide the following platform specific ports, all compiled with the GNU
gfortran compiler:

- Linux x86_32 (Intel/AMD, 32-bit)

- Linux x86_64 (Intel/AMD, 64-bit)
- MacOS x86_32 (Intel, 32-bit)
- MS-Windows x86_32 (Intel/AMD, 32-bit)
- NeoFreerunner (ARM, 32-bit)
  Please note the **new port for the ARM processor platform!** This binary is compiled on this extraordinary computeserver!
  If you work on a (yet) not supported platform and have a Fortran90 compiler, please get in contact with me (email: Eildert.Groeneveld@gmx.de (mailto:Eildert.Groeneveld@gmx.de)).

Download

Download the latest and greatest VCE version:

- Binaries for different platforms
- Documentation
- Instructions for Installation
- Example files for running some basic tests

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