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NAME

musecc − multiset canonical correlation analysis

SYNOPSIS

musecc **−c** *nsets n1 n2 ... nnsets*
[**−n** *nfactors*] [**−e** [*nr nc* [*sr sc*]] | **−M** *mask_file* [*mask_value*]]
[**−saveC** *file* | **−C** *file*] [**−saveT**]
[**−sumcor** | **−ssqcor** | **−maxvar** | **−minvar** | **−genvar**]
[**−aa** | **−saa** | **−aCa** | **−saCa**]

−c is not optional.

DESCRIPTION

musecc performs multiset linear canonical correlation analysis with 5 different object functions and 4 different constraints (and orthogonality criteria). The (at least 2) sets of input variables (all in one byte, short, int or float HIPS file, may be bandinterleaved, see *bil*) are transformed into *nmin* = min(*n1,n2,...,nnsets*) stages of *nsets* canonical variates (all in one float HIPS file) that are uncorrelated (as defined by the orthogonality criterion) across stages, and that possess the characteristic defined by the chosen object function within each stage. The object function is specified by **−sumcor**, **−ssqcor**, **−maxvar**, **−minvar** or **−genvar**. The constraint (and orthogonality criterion) is specified by **−aa**, **−saa**, **−aCa** or **−saCa**.

The optimization problems involved are solved by means of a system call to GAMS, the **G**eneral **A**lgebraic **M**odeling **S**ystem, cf. references. The GAMS code needed is written by *musecc*. *musecc* writes output to several files

musecc.cov
musecc.gms
musecc.log
musecc.lst
musecc.wts

These files are not deleted; they can be viewed to get more detailed information about the solutions to the optimization problems. Also, *musecc* writes a log file *log<pid>*.

OPTIONS

−c *nsets n1 n2 ... nnsets*
number of sets of variables followed by number of variables in each set (not optional)

−n *nfactors*
number of factor stages to output (defaults to *nmin*)

−e [*nr nc* [*sr sc*]]
extract rectangular area for statistics generation only; *nr, nc, sr* and *sc* are number of rows and columns, and starting row and column respectively (default is a centered rectangle half the size of the original image)

−M *mask_file* [*mask_value*]
statistics are calculated only where *mask_file* (a byte HIPS image) has the value *mask_value* (defaults to 0)

−saveC *file* | **−C** *file*
write (**−saveC**) or read (**−C**) mean vector and covariance matrix in HIPS format (double) to or from *file*

−saveT save mean vector and transformation matrix in HIPS (double) file *tra<pid>*

−sumcor | **−ssqcor** | **−maxvar** |
specifies function of the transformed variables' covariance matrix to optimize (defaults to **−sumcor**)

−sumcor	maximize sum of elements
−ssqcor	maximize sum of squared elements
−maxvar	maximize largest eigenvalue
−minvar	minimize smallest eigenvalue
−genvar	minimize determinant

−aa | **−saa** | **−aCa** |
specifies constraint (and orthogonality criterion between canonical variates' stages) under which to optimize the chosen function of the transformed variables' covariance matrix (defaults to **−aCa**)

−aa	projection vectors are unit vectors in each set
−saa	sum of projection vectors is unit vector
−aCa	weighted projection vectors are unit vectors in each set (each transformed variable has unit variance)
−saCa	sum of weighted projection vectors is unit vector (transformed variables' variances add to unity)

SEE ALSO

bil(1), bip(1), maf(1)

CREDIT

The heart of *musecc* is the GAMS NLP solver CONOPT written by Arne Drud. Also, Arne wrote the GAMS code created and run by *musecc*. Much of the code for *musecc* comes from *maf* written by Rasmus Larsen on my initiative and under my supervision. Also, Rasmus was very helpful at several stages of the job.

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