NAME

osp − orthogonal subspace projection

SYNOPSIS

osp −S *spectra_filename* [**−t**] [**−svd**] [**−i**] [**−saveT** *transformation_filename*] [**−o**] [**−v**] [< inseq > outseq]

DESCRIPTION

osp reads a spectra file with spectra written column-wise in a matrix **U** (or if **−t** is specified row-wise in a matrix $\mathbf{U}^T$), optionally calculates the singular values of **U**, and removes the spectra by means of orthogonal subspace projection, OSP. This is done by multiplying all pixels in the inseq by the matrix **P** which equals $\mathbf{U}\,(\mathbf{U}^T\mathbf{U})^{-1}\,\mathbf{U}^T$ if **−i** is specified and $\mathbf{I} - \mathbf{U}\,(\mathbf{U}^T\mathbf{U})^{-1}\,\mathbf{U}^T$ if not. If no inseq is specified (in this case specify **−o**) **P** can be output to *transformation_filename* by means of **−saveT** (for possible later use with *lintrans*), and if **−v** is specified results of the matrix operations are written to *stderr*.

The use of **−S** is not optional.

The spectra file must be HIPS double format and the transformation file is HIPS double format. Input must be byte, short, int, float or double in BIP format (band-interleaved by pixel, see *bip*). Output is float in BIP format.

OPTIONS

−S *spectra_filename*
: spectra in *spectra_filename* are specified column-wise, i.e., read **U**; must be specified

−t spectra in *spectra_filename* are specified row-wise, i.e., read $\mathbf{U}^T$

−svd do not calculate singular values of **U**

−i **P** is $\mathbf{U}\,(\mathbf{U}^T\mathbf{U})^{-1}\,\mathbf{U}^T$ rather than $\mathbf{I} - \mathbf{U}\,(\mathbf{U}^T\mathbf{U})^{-1}\,\mathbf{U}^T$

−saveT *transformation_filename*
: the matrix **P** is written to *transformation_filename*

−o *stdin* is not read and nothing is output to *stdout* (makes sense with **−v** and/or **−saveT** only)

−v verbose

EXAMPLES

osp −S specfile.hips −v −o

osp −S specTfile.hips −t −i −saveT tranfile.hips −v −o

bil −a inseq | bip | osp −S specfile.hips −v | bip | bil −a > outseq

SEE ALSO

bip, bil, unmix, project, maf, lintrans, spam

REFERENCES

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