Chandra X-ray Center

AHELP for CIAO 3.4 **acrosscorr** Context: tools

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Synopsis

Cross−correlate two N−dimensional images or autocorrelate an image

Syntax

```
acrosscorr  infile1 infile2 outfile [crop] [pad] [center] [clobber]
[verbose] [kernel]
```

Description

Compute the correlation of two N−dimensional images or compute the autocorrelation of a single N−D image (when infile2 is set to "NONE").

`acrosscorr' uses the FFT method of computing the cross−correlation, which assumes that the edges wrap around. The cross−correlation of two arrays is computed as:

```
C = inverseFFT( FFT(A) * FFT(B)' )
```

which differs from FFT convolution only in the complex conjugation of the FFT of the 2nd array.

Example 1

```
acrosscorr infile1=sig1.fits infile2=sig2.fits outfile=my_out.fits
```

Correlate the arrays (stored as images) in files sig1.fits and sig2.fits and store the results in my_out.fits

Example 2

```
acrosscorr infile1=my_evts.fits[STDEVT][bin time=0:10000:1]
infile2=none outfile=/tmp/time.fits center=yes
```

Creates a 1−D "image" from the STDEVT table in the file my_evts.fits, binned on the time column from 0 to

10000 in 1 [unit] bins, then calculates the autocorrelation of this image. The output is centered such that 0 offset is in the center of the array.

Example 3

```
acrosscorr infile1=sig1.fits infile2=bigger_sig2.fits
outfile=/tmp/my_out.fits crop=yes
```

The output is cropped to the size of sig1.fits

Parameters

name	type	ftype	def	min	max	reqd	autoname
infile1	file	input				yes	
infile2	file	input				yes	
outfile	file	output				yes	yes
crop	boolean		no				
pad	boolean		no				
center	boolean		no				
clobber	boolean		no				
verbose	integer		0	0	5		
kernel	string		default				

Detailed Parameter Descriptions

Parameter=infile1 `(file required filetype=input)`

First input image file.

The input image can have the following data types: "short" (BITPIX=16), "long" (BITPIX=32), "float" (BITPIX=−32), and "double" (BITPIX=−64). Complex inputs are not currently supported. Alternatively a FITS binary table can be binned using the datamodel syntax to specify the image (see example).

Parameter=infile2 `(file required filetype=input)`

Second input image file. If infile2 is "NONE" (or 'none'), then the autocorrelation of infile1 is computed. Otherwise, the syntax is the same as for infile1.

Parameter=outfile `(file required filetype=output autoname=yes)`

Output image file.

The output image is an image of type FLOAT (32bit IEEE floating point number). The pad and crop parameters determine the output size. By default, the output image is the maximum size in each direction from both input

 Example 3

files. Thus if infile1 is 5x2 and infile2 is 3x3, the output will be 5x3. The autoname filename suffix is "_corr".

Parameter=crop `(boolean default=no)`

If crop = yes, the output is cropped to the size of infile1.

If crop = yes, the output is cropped to the size of infile1. Cropping is done after the correlation is performed, so if both crop and pad are set to "yes", the final output will be cropped.

Parameter=pad `(boolean default=no)`

If pad = yes, the data are padded to the size of infile1 + infile2.

If pad = yes, the data are padded to the size of infile1 + infile2. Padding is done before the correlation is performed.

Parameter=center `(boolean default=no)`

If center=yes, the zero−offset point will be in the center of the output data array. Otherwise, it will be at the 1 pixel location.

Parameter=clobber `(boolean default=no)`

Clobber existing output files?

Parameter=verbose `(integer default=0 min=0 max=5)`

Processing verbosity; 0 is no output, 5 is high verbosity.

Parameter=kernel `(string default=default)`

Output format. Can be "fits", "iraf", or "default", where 'default' uses the format of the input files.

Bugs

See the bugs page for this tool on the CIAO website for an up−to−date listing of known bugs.

See Also

sherpa
  tpsf, tpsf1d
tools
  aconvolve, apowerspectrum, arestore, csmooth, dmcoords, dmfilth, dmregrid, mkpsf, psf_project_ray

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Parameter=crop (boolean default=no)

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