Chandra X-ray Center

AHELP for CIAO 3.4 # reproject_image_grid

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Synopsis

Projects image from one WCS to another

Syntax

```
reproject_image_grid  infile outfile xsize ysize xcenter ycenter theta
pixelsize projection [resolution] [method] [coord_sys] [lookupTab]
[clobber] [verbose]
```

Description

`reproject_image_grid' maps an image in one WCS reference frame to another. For each output pixel in the matchfile it maps an n–point polygon onto the input image via the WCS transforms. The area of each pixel covered in the input image is then used to compute the output pixel value.

`reproject_image_grid' can be used to project an image w/ one tanget point to another tanget point as is useful when merging multiple observations or when matching data across missions.

Any Null/NaN valued pixels or pixels outside the data–subspace or pixels outside the input image are assigned a value = 0.

Example

```
reproject_image_grid infile=img.fits matchfile="none" outfile=new.fits
xcenter='12:32:54.334" ycenter="+54:45:23.996" xsize=512 ysize=512
pixelsize=0.5\" theta=0 projection=tan resolution=1 coord_sys=world
clob+
```

When the matchfile is set to "none"; users can create a new image using the xcenter, ycenter, xsize, ysize, pixelsize, theta, and projection parameters. In this example the infile image is reprojected to a tangent point specified by the xcenter and ycenter values.

Note: the \ before the " is to escape the " (for arc–second) from getting interpreted by the user shell (eg (ba)sh, (t)csh). If prompted for the value the \ should not be included.

Parameters

name	type	ftype	def	min	max	units	reqd
infile	file	input					yes
outfile	file	output					yes
xsize	integer		1	1		pixels	yes
ysize	integer		1	1		pixels	yes
xcenter	string					degrees	yes
ycenter	string					degrees	yes
theta	real		0	0	360	degrees	yes
pixelsize	string					degrees/pixel	yes
projection	string		tan				yes
resolution	integer		1	0			
method	string		sum				
coord_sys	string		world				
lookupTab	string						no
clobber	boolean		no				
verbose	integer		0	0	5		

Detailed Parameter Descriptions

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

The input image.

The input 2D image.

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

The output file name

Contains the reprojected image.

Parameter=xsize `(integer required default=1 min=1 units=pixels)`

Image size in X direction

Size is in pixels

Parameter=ysize `(integer required default=1 min=1 units=pixels)`

Image size in Y direction

Size is in pixels

Parameter=xcenter `(string required units=degrees)`

X–Center of image in world coordinates

The center of the image. This is where the tangent point is located and will be placed at the center of the image (eg at xsize/2).

This may be entered either in degrees, 210.4568777, or in sexagesimal format, 14:59:32.998 (values not intended to be equal).

Parameter=ycenter `(string required units=degrees)`

X–Center of image in world coordinates

The center of the image. This is where the tangent point is located and will be placed at the center of the image (eg at ysize/2).

This may be entered either in degrees, 32.998666, or in sexagesimal format, +32:59:32.312 (values not intended to be equal).

Parameter=theta `(real required default=0 min=0 max=360 units=degrees)`

Rotation angle (degrees)

Position angle: angle between North and +Y–axis measured counter–clockwise.

Parameter=pixelsize `(string required units=degrees/pixel)`

Pixel size

The size of the pixels on the sky. (Note: same value used for X and Y axes).

This value can be entered either in degrees: 1.345e–4 or 0.0001345, arc–minutes: 0.00134', or in arc–seconds: 0.495"

Parameter=projection `(string required default=tan)`

Type of world coordinate system

Currently only tangent plane projections are supported.

Parameter=resolution `(integer default=1 min=0)`

Controls quality of projection; number of points per side of polygon

An n–sided polygon that outlines the output pixel is mapped to input image via the WCS transforms. The number of points along each side of the pixel is the resolution parameter. A value of '1' indicated that just the corners of the pixel will be used. A value of '2' indicates that the corner and the middle of the pixel–edge line segments will be use. And so on. The more points on the polygon, the better the polygon will approximate the possibly non–linear transform between the images. However, the more points on the polygon, the longer the run–time of the tool.

A value of '0' can also be used. This is a special quick mode that simply maps the center output pixel to a single input pixel and uses that value in the output image. This can be done very quickly; however, when

something other than a simple shift of the images is need this can result in image artifacts (for example aliasing or 'dead' regions). Also the 'method' is not applicable in this useage. The output image is essentially "interpolated", so if the pixel scales are different the flux will not be preserved.

Parameter=method `(string default=sum)`

Controls output normalization

The output image can either represent a conservation of "sum" (integral over an apperature on the input and output image would give same value) or it can represent an "average" where the output pixel value represents an average input value.

Typically users will use "sum" to reproject the COUNTS image and will use "average" to reproject the EXPOSURE image when making fluxed images.

Parameter=coord_sys `(string default=world)`

Coordinate system to do the pixel mapping in

Currently only "world" coordinate system is supported. Logical pixels in the output image are mapped to physical pixels which are then mapped to world coordinate (RA,Dec). These are then mapped back to physical pixels in the input image and then back to image pixels in the input image. [TBD: implement "physical" and "image" coord sys's]

Parameter=lookupTab `(string not required)`

The header merging table

Rules to merge the headers when more than one file supplied. If set to NONE or a blank string then the header from the first file is used.

Parameter=clobber `(boolean default=no)`

Remove output if it exists?

Used to specify whether or not to clobber existing file that has the same name as the specified output file

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

The tool chatter level

Verbose can be from 0 to 5, generating different amounts of debugging output.

Bugs

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

See Also

tools
>   dmcoords, reproject_events, reproject_image, skyfov

Parameter=method (string default=sum)