fits_wavelet
March 27, 2008

This program will perform a Daubechies wavelet transform on an input image and turn off the wavelet coefficients up to a certain percentage of the total size.

Usage:

fits_wavelet <image> <limit>

<image> should be an image in FITS format and <limit> should be a number between 0.0 and 1.0.

Output:

filtered_<image>

The output image is also in the FITS format and is readily viewable in FV, available from the NASA website, or the Sky Image Processor, useable as a java applet from Dr. John Simonetti, Virginia Tech,

http://www.phys.vt.edu/~jhs/SIP.

Compilation:

This code requires a flavor of GNU+Linux, the CFITSIO library, and the GNU Scientific Library. Both are freely available on the internet. This code compiles fine with gcc-3.4 using

gcc -o fits_wavelet fits_wavelet.c -lm -lgsl -lgslcblas –lcfitiso

It is possible to compile this code on Windows using the Cygwin emulation layer. The process is as follows:

1.) Install Cygwin. Make sure to install all packages in the Devel and Libs branches. (This installs both gcc and gsl.)
2.) Download and install the CFITSIO library from the CFITSIO website. Make sure to download the UNIX .tar file. Click on Cygwin.exe to get a BASH prompt and compile/install CFITSIO with the following commands:

```
tar -xzvf  cfitsio-<version>.tar.gz
cd cfitsio-<version>
./configure --prefix=/usr/local
make
make install
```

3.) Compile fits_wavelet.c:

```
gcc -o fits_wavelet fits_wavelet.c -lm -lgsl -lgslcblas –lcfitiso
```

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Examples:

The first image is the sample image, rp275_1000.fits. The second image is its transform and has 85% of its wavelet coefficients turned off. The third image is a subtraction of the two to show the information removed by transform.