

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 -lcfitsio
```

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
```

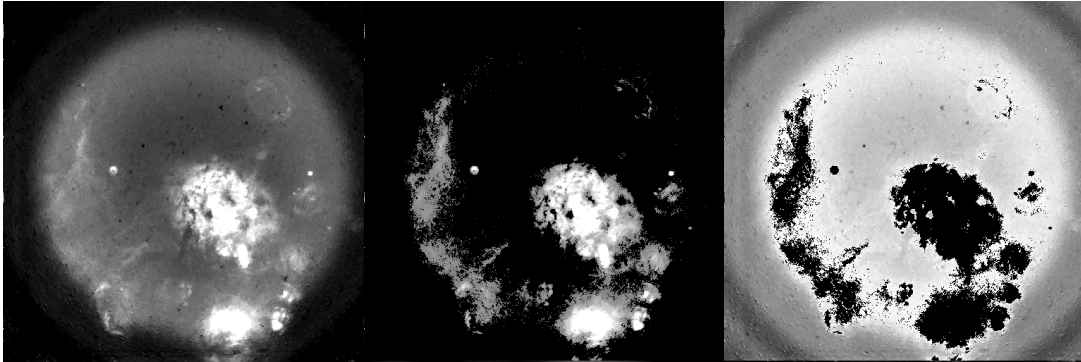
- 3.) Compile fits_wavelet.c:

```
gcc -o fits_wavelet fits_wavelet.c -lm -lgsl -lgslcblas -lcfitsio
```

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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.



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