

ADASS 2004 Highlights

Some Talks and Demos of Interest at [Astronomical Data Analysis Software & Systems XIV](#), Pasadena, CA, Oct 17-21, 2004

Talks

- [Blind Deconvolution](#), Tony Chan (UCLA)
Both the image **and** psf are recovered from a blurred and noisy image.
- [Pan-STARRS](#), Eugene Magnier, IfA
 - Killer asteroid finder
 - 4 x 1.8 m telescopes, each with 3 deg fov and 1G pixel CCD.
 - **"All-Sky" (30,000 sq deg) survey every 7 nights** down to 24 mag (5 sigma)
 - Online c. 2008-2009; PS1 prototype Jan 2006
 - Sloan-like filter selection
- [GOODS](#): The Great Observatories Origins Deep Survey
 - HST, Chandra, Spitzer + XMM-Newton
 - Useful for finding galaxies and QSOs for $z > 4$ and type Ia SNe for $0.2 < z < 2$.
- [Mars Exploration Rover](#)
- [Science with Virtual Observatory tools](#) Paolo Padovani, ESO
"Doing real science without doing real observations."
 - The next logical step after online catalogs ([NED](#), [Simbad](#)), online databases ([HEASARC](#)) and central access points ([CADC](#))
 - 1 Tb of new data/night (!?)
 - VO standards and protocols [IVOA](#)
 - *in situ* data analysis (e.g., Aladin)
 - Exercise: Multiwavelength analysis of GOODS data (HDF, CDF + ground-based spectroscopy) to identify QSO 2s [Padovani et al.](#)
- [Aladin and the VO FAQ](#)
 - AVO interface for displaying and analyzing multiwavelength data, specifically correlating catalog data with astronomical images.
 - Implemented in Java
- [The Development of DS9](#)
 - Interesting mostly for mention of need for multiprocessor support.
- [SExtractor](#)
 - Source identification tool
 - Has its own optimal filtering algorithm.
 - Used at Saclay for LAT source catalog generation.

"Focus" Demos

- [NVO](#)
 - How to make astronomical data and catalogs available using standard VO protocols.
 - [Registry Services](#) support publishing of data, querying of specific databases, and harvesting wherein different registries allow information to be passed between them so that a query at one registry may find data at a different one.
- Python Tools for Analysis and Visualization of Astronomical Data
 - Tools from [Space Telescope Science Institute](#):
 - [numarray](#) A replacement for the Numeric package; offers similar array manipulation functionality as matlab or IDL.
 - [PyFITS](#) A nice interface for accessing data in FITS files.
 - [numdisplay](#) Steer image display using ds9 or ximtool from Python.
 - [PyRAF](#) Python replacement for the IRAF command language.
 - [matplotlib](#) A default plotting package for Python?\\
An example plot:

test_plot.py

```
from matplotlib.matlab import *

def join(x, sign=1):
    x1 = list(x)
    x2 = list(sign*x)
    x1.reverse()
    x1.extend(x2)
    return array(x1)

func = "x**3 - x + 1"
f = eval("lambda x: " + func)

x = arange(-2, 8, 0.01)
y2 = f(x)
indx = where(y2 > 0)
x = x[indx]
y = sqrt(y2[indx])
x = join(x)
y = join(y, -1)

figure(1, figsize=(6, 6))
clf()
plot(x, y, 'k')
xymax = 20
plot([0, 0], [-xymax, xymax], ':b', [-xymax, xymax], [0, 0], ':g')

xx = arange(-1, 8)
yy = sqrt(f(xx))
indx = where((yy % 1) == 0)
plot(xx[indx], yy[indx], "D")

xlabel(r'$x$')
ylabel(r'$y$')
eq = '$y^2 = ' + func.replace('**', '^').replace('*', '') + '$'
legend((eq, '$x=0$', '$y=0$'))

xlim(-1.5, 2)
ylim(-2, 2)
```

Here is the result:\\\

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An example of image display using this package:\\\

dc1_image.py

```
import pyfits
from matplotlib.matlab import *

dc1_map = pyfits.open("dc1_counts_map.fits")
dc1_map.info()

im = dc1_map[0].data.copy()

clf()
figure(1, figsize=(8, 4))

imshow(log10(im[0] + 1e-5))
```

and the resulting image:\\\