Subject: Re: Determining circularity Posted by Craig Markwardt on Sat, 26 May 2001 02:04:24 GMT View Forum Message <> Reply to Message

Todd Clements <mole6e23@hotmail.com> writes:

```
Hi all...
I was wondering if anyone knew of routines to determine the circularity
of an image. We have images from our detector and for optimal
calibration, they need to be as circular as possible, and it's difficult
to tell by eye when it's close but not quite there.
Generally these images have fairly well defined edges, although there is
definitely some gray area as to what consistutes the edge, which makes
it difficult to determine by eye sometimes.
Basically, I guess it comes down to fitting the edge of the image to an
ellipse, but there has to be some determination of what the edge is as
well.
```

Possible solution:

- 1. Edge filter with ROBERTSON (or perhaps SOBEL)
- 2. Extract X- and Y-position of edge points (use a threshold)
- 3. Fit to an ellipse using MPFITELLIPSE

The last one is from my web page, and can be used for fitting an ellipse to a set of scattered points. It's not theoretically perfect but is good for rough calcs. Of course you need MPFIT as well. Here is a sample go-round. First I construct some fake data and then perform the steps above.

```
;; Construct a filled circle with a radius of 6

x = findgen(101)*0.2 - 10. & y = x

xx = x # (y *0 + 1) ;; Construct X, Y, and R (radius) values

yy = (x*0+1) # y

rr = sqrt(xx^2 + yy^2)

wh = where(rr LT 6.) ;; Fill the circle

im = xx*0

im(wh) = 1

;; Step 1. Extract edge-filtered image

edge = roberts(im)

;; Step 2. Extract edge points using threshold value (value of 2 here)

wh = where(edge EQ 2)

xim = xx(wh) & yim = yy(wh)
```

;; Step 3. Fit the image print, mpfitellipse(xim, yim)

... results are ...

5.96942 5.96942 -0.100046 -0.100019 0.00000

XSEMI YSEMI XCENTER YCENTER ROTATION = 0

I make it look easy. The real trick is to find the right threshold to select the points from the data, and filtering out any other noise which will surely screw up the edge enhancement.

Craig

Craig B. Markwardt, Ph.D. EMAIL: craigmnet@cow.physics.wisc.edu Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
