Subject: Re: creating elliptically shaped images
Posted by David Fanning on Mon, 24 Nov 2003 15:55:21 GMT
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mark writes:

> I'd like to form an image which has an elliptical shape and where all
> the pixels within this ellipse have values corresponding to any given
> function that I would specify, the simplest example being a uniform
> image (i.e. a value of 1 for all the pixels in the ellipse). Is there
> any nice way to do this in IDL or MATLAB other than looping through
> all the pixels and determining whether any given one lies within the
> ellipse?

I'd use the IDLanROI object to make an ROI out of
your ellipse. Then you can easily create an image
mask, see if a point is inside or outside the ROI, etc.

Cheers,

David

--
David W. Fanning, Ph.D.
Fanning Software Consulting, Inc.
Phone: 970-221-0438, E-mail: david@dfanning.com
Coyote's Guide to IDL Programming: http://www.dfanning.com/
Toll-Free IDL Book Orders: 1-888-461-0155

Subject: Re: creating elliptically shaped images
Posted by Steven Lord on Mon, 24 Nov 2003 16:36:26 GMT
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mark wrote:
> I'd like to form an image which has an elliptical shape and where all
> the pixels within this ellipse have values corresponding to any given
> function that I would specify, the simplest example being a uniform
> image (i.e. a value of 1 for all the pixels in the ellipse). Is there
> any nice way to do this in IDL or MATLAB other than looping through
> all the pixels and determining whether any given one lies within the
> ellipse?

It sounds like you want either a contour plot or an isosurface plot, or
something along those lines. See HELP CONTOUR and HELP ISOSURFACE, and look
at the examples in the Volume Visualization Techniques chapter of the Using
MATLAB Graphics manual.

--
Steve Lord
slord@mathworks.com

Subject: Re: creating elliptically shaped images
Posted by Matt Feinstein on Mon, 24 Nov 2003 17:15:00 GMT
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On Mon, 24 Nov 2003 08:55:21 -0700, David Fanning <david@dfanning.com>
wrote:

> mark writes:
>
>> I'd like to form an image which has an elliptical shape and where all
>> the pixels within this ellipse have values corresponding to any given
>> function that I would specify, the simplest example being a uniform
>> image (i.e. a value of 1 for all the pixels in the ellipse). Is there
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>> all the pixels and determining whether any given one lies within the
>> ellipse?
>
> I'd use the IDLanROI object to make an ROI out of
> your ellipse. Then you can easily create an image
> mask, see if a point is inside or outside the ROI, etc.
>
> Cheers,
>
> David

I'll bet the people in the Mtlab group you cross-posted to are
wondering what you're talking about...

Matt Feinstein

--
There is no virtue in believing something that can be proved to be true.

Subject: Re: creating elliptically shaped images
Posted by K. Bowman on Mon, 24 Nov 2003 17:32:05 GMT
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In article <a9116224.0311240712.618f4088@posting.google.com>,
mruschin@hotmail.com (mark) wrote:

> I'd like to form an image which has an elliptical shape and where all
> the pixels within this ellipse have values corresponding to any given
> function that I would specify, the simplest example being a uniform
> image (i.e. a value of 1 for all the pixels in the ellipse). Is there
> any nice way to do this in IDL or MATLAB other than looping through
> all the pixels and determining whether any given one lies within the
> ellipse?
>
> Mark

I think this does the trick.

Ken Bowman

```
nx = 300
ny = 300

a = 0.75
b = 0.50

x = 2.0*((FINDGEN(nx)+0.5)/nx - 0.5)
y = 2.0*((FINDGEN(nx)+0.5)/nx - 0.5)

xx = REBIN(x, nx, ny, /SAMPLE)
yy = REBIN(REFORM(y, 1, ny), nx, ny, /SAMPLE)

ellipse = 255*(xx^2/a + yy^2/b LT 1.0)

WINDOW, XSIZE = 300, YSIZE = 300
TV, ellipse
```

Subject: Re: creating elliptically shaped images
Posted by Craig Markwardt on Mon, 24 Nov 2003 17:37:23 GMT
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mruschin@hotmail.com (mark) writes:

> I'd like to form an image which has an elliptical shape and where all
> the pixels within this ellipse have values corresponding to any given
> function that I would specify, the simplest example being a uniform
> image (i.e. a value of 1 for all the pixels in the ellipse). Is there
> any nice way to do this in IDL or MATLAB other than looping through
> all the pixels and determining whether any given one lies within the
> ellipse?

You really have two questions. One is, how do I make a 2D function, and the other is, how do I mask it to an elliptical shape? The answers are close to the same for both. Making a 2D function is usually very simple, as long as you expand your X and Y vectors to be 2D as well.

Let's say you have an N X-pixels and M Y-pixels, so your desired array is IMG = fltarr(N,M). You would have a N-vector called X which labels the X pixels, and an M-vector called Y which labels the y pixels.

Further suppose you have a

```
; Expand X and Y to full 2D arrays
XX = X # (fltarr(m)+1)
YY = (fltarr(n)+1) # Y

; Define ellipse
A = ... ;; semi-major axis
B = ... ;; semi-minor axis
U = (XX/A)^2 + (YY/B)^2
;; Ellipse 'radius' function is simply U
F_ELLIPSE = U

;; Make mask - any point inside the ellipse
MASK = F_ELLIPSE LT 1

;; Make your own user function
F_USER = F(XX,YY)

;; Finally, mask it so only points inside the ellipse are there
F_USER = F_USER * MASK
```

Now, anticipating your question, if you want an arbitrary position angle and/or centroid, then you need to do a little extra work, but not much. You would replace the U = ... line above with the following:

```
  C = cos(theta) & S = sin(theta)
  XP = XX - XCENTROID & YP = YY - YCENTROID
  U = ( (XP * (C/A) - YP * (S/A))^2 + (XP * (S/B) + YP * (C/WIDY))^2 )
```

and then continue.

Good luck!
Craig

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

Subject: Re: creating elliptically shaped images
Posted by David Fanning on Mon, 24 Nov 2003 17:48:25 GMT
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Matt Feinstein writes:

> I'll bet the people in the Matlab group you cross-posted to are
> wondering what you're talking about...

Those guys over there better get used to me.
I'm beginning to *like* Matlab! :-)

Cheers,

David

--
David W. Fanning, Ph.D.
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Subject: Re: creating elliptically shaped images
Posted by mruschin on Tue, 25 Nov 2003 08:28:29 GMT
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David Fanning <david@dfanning.com> wrote in message
news:<MPG.1a2bf24fe8dc9551989757@news.frii.com>...
> Matt Feinstein writes:
>
>> I'll bet the people in the Matlab group you cross-posted to are
>> wondering what you're talking about...
>
> Those guys over there better get used to me.
> I'm beginning to *like* Matlab! :-)

>
> Cheers,
>
> David

Thanks for the tip!
