Subject: Re: ROT is ROTTEN (a solution)
Posted by thompson on Wed, 21 Nov 2001 17:34:44 GMT
View Forum Message <> Reply to Message

"Martin Downing" <martin.downing@ntlworld.com> writes:

> Hi All,

> This was an interesting problem - I certainly hadn't noticed it before. The
> reason for the behaviour is precision error in the arithmatic which works
> out the poly2d coefficients. It can be corrected effectively by modifying
> line 128 of rot.pro:

> from:

> theta = -angle/!radeg ;angle in degrees CLOCKWISE.

> to:

> theta = (-angle MOD 360) *acos(0.0d)/90 ;angle in degrees CLOCKWISE. (mod
> MRD 21/11/2001 to correct for precision error)

As others have said, great job! Can I make one small suggestion, though.
Instead of acos(0.0d)/90, can I suggest !dpi/180?

 theta = (-angle MOD 360) * !dpi/180

William Thompson

> This does two things, firstly (-angle MOD 360) ensures that a precision
> error does not propagate due to large angles which contain multiple 360
> degree rotations,
> for instance that 390.45 degree rotation is treated exactly the same as
> 30.45 degrees [i.e. n*360+theta = = theta].

> Secondly, substituting (acos(0.0d)/90) for !radeg gives a full DOUBLE
> precision representation of theta in radians.

> This fixes it completely as far as I can see:
> IDL> a = findgen(5,5)
> IDL> for deg = -720, 720,90 do print, deg, total(rot(a, deg))

> -720 300.000
> -630 300.000
> -540 300.000
> -450 300.000
> -360 300.000

> -270 300.000
> -180 300.000
> -90 300.000
> 0 300.000
> 90 300.000
> 180 300.000
> 270 300.000
> 360 300.000
> 450 300.000
> 540 300.000
> 630 300.000
> 720 300.000

> compared this to previous output:
> IDL> for deg = -720, 720,90 do print, deg, total(rot(a, deg))

> -720 252.000
> -630 250.000
> -540 300.000
> -450 273.000
> -360 237.000
> -270 290.000
> -180 216.000
> -90 244.000
> 0 300.000
> 90 222.000
> 180 221.000
> 270 300.000
> 360 247.000
> 450 249.000
> 540 300.000
> 630 251.000
> 720 242.000

> Quite how RSI had left the code like that for so long who knows.....(but if
> they want to send me a copy of David's 2nd Ed. that would be nice!)

> cheers

> Martin

> --
> Martin Downing,
> Clinical Research Physicist,
> Grampian Orthopaedic RSA Research Centre,
> Woodend Hospital, Aberdeen, AB15 6LS.
> Tel. 01224 556055 / 07903901612
> Fax. 01224 556662

> m.downing@abdn.ac.uk

> "Bhautik Jitendra Joshi" <bjoshi@cse.unsw.EDU.AU> wrote in message
> news:Pine.GSO.4.21.0111211537260.24363-100000@haydn.orchestra.cse.unsw.EDU.A
> U...
>> Hi all,
>>
>> The question I put to you all today is this: is ROT completely and utterly
>> broken?
>>
>> Lets take a nice and normal 5x5 float array:
>>
>> MOO>a=findgen(5,5) & print, a
>>   0.00000   1.00000   2.00000   3.00000   4.00000
>>   5.00000   6.00000   7.00000   8.00000   9.00000
>>   10.0000   11.0000   12.0000   13.0000   14.0000
>>   15.0000   16.0000   17.0000   18.0000   19.0000
>>   20.0000   21.0000   22.0000   23.0000   24.0000
>>
>> Now, lets do a quick checksum:
>>
>> MOO>print, total(a)
>>   300.000
>>
>> So any 90 degree rotations we perform should maintain this. Lets try it
>> out:
>>
>> MOO>print, total(rot(a,90))
>>   296.000
>>
>> OMG! *world in crisis* How to fix? Use interpolation.
>>
>> MOO>print, total(rot(a,90,/INTERP))
>>   300.000
>>
>> *phew* Lets do a clockwise rotation instead.
>>
>> MOO>print, total(rot(a,-90,/interp))
>>   300.000
>>
>> So, for those who can remember their high school math, -90 degrees is the
>> same as a 270 degree rotation.
>>
>> MOO>print, total(rot(a,270,/interp))
>>   290.000
>>
>> argh! 360 degrees - a complete rotation, no difference, right?

```
>>
>> MOO>print, total(rot(a,360,/interp))
>>      290.000
>>
>> Perhaps its the interpolation thats stuffing it up. Lets leave it out.
>>
>> MOO>print, total(rot(a,360))
>>      262.000
>>
>> *brain melts*
>>
>> It doesn't make a difference whether you use the interp or cubic keywords,
>> nor if you shift it so that the centre of rotation is set to be the corner
>> of the pixel rather than the centre of the pixel. If it doesn't work for
>> multiples of 90 it certainly is going to have issues with arbitrary
>> angles.
>>
>> ROT is bad. Can it be fixed? Is there a (fast) alternative?
>>
>> Cheers,
>> Bhautik
>>
>>    _____
>>   /                                              \
>>   |bjoshi@geocities.com   | phone: 0404032617          |
>>   |ICQ #: 2464537         | http://cow.mooh.org        |
>>   \~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~(__)~~~~~~~/
>>        (__)                     |..|--\
>>       /--|^^|                   moo | |--|
>>       |--| |                      \OO/||^
>>       ^||\oo/ moo
>>
```