
Subject: Re: ROT is ROTTEN (a solution)

Posted by [Heike Koch-Beuttenmue](#) on Wed, 21 Nov 2001 13:02:16 GMT

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Martin Downing wrote:

>
> Hi All,
>
> This was an interesting problem - I certainly hadn't noticed it before. The
> reason for the behaviour is precision error in the arithmetic 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)
>
> 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
>
> -----
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>
Though there are some differences between the rot of pvwave and idl the
same correction helps pvwave to get the right result for rot (with
interp):

uncorrected: print, total(e1)
      282.000
corrected:

```

```
print, total(e2)  
300.000
```

Best regards

Heike Koch-Beuttenmüller
