Subject: Julian Day NE Julian Day
Posted by andrewcool777 on Fri, 18 Nov 2016 12:30:31 GMT
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Hi All,

So in converting the time stamp from an astro image to Julian Day with JULDAY, I start off with seconds of 6.31, and after doing the back conversion with CALDAT, I end up with seconds of 6.3100353!

Is this to be expected? Is it "wrong?" Is it one of those weird digital precision things that David F. used to bang on about? (Hi David)

```
IDL> print,!version
{ x86_64 Win32 Windows Microsoft Windows 8.5.1 Nov 14 2015      64      64}
IDL>
IDL> Jd = julday(10,1,2016,10,10,6.31)
IDL> print,jd,format='(F20.10)'
  2457662.9236841439
IDL> caldat,jd,mon,d,y,h,m,s
% Compiled module: CALDAT.
IDL> print,y,mon,d,h,m,s
       2016          10           1          10          10       6.3100353
```

And just to show that I'm calling the inbuilt IDL routines, and not altered copies:-

```
IDL> help,/source
Compiled Procedures:
$MAIN$
CALDAT                  C:\Program Files\Exelis\IDL85\lib\caldat.pro

Compiled Functions:
JULDAY                  C:\Program Files\Exelis\IDL85\lib\julday.pro
```

I'm puzzled. And a bit concerned.

TIA,

Andrew Cool

www.skippysky.com.au (for all your astro weather forecast needs...)

Subject: Re: Julian Day NE Julian Day
Posted by wlandsman on Fri, 18 Nov 2016 14:43:47 GMT
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Yes, this is a precision issue. As noted in
http://aa.usno.navy.mil/data/docs/JulianDate.php

"Typically, a 64-bit floating point (double precision) variable can represent an epoch expressed as a Julian date to about 1 millisecond precision."

and the IDL results are "equal" to within 1 millisecond.

One way to improve the precision is to use modified Julian date
MJD = JD - 2400000.5 The highest precision Astronomy routines (
http://www.iausofa.org/index.html) break up Julian date into two double precision numbers in order to maintain precision.

-Wayne

On Friday, November 18, 2016 at 7:30:34 AM UTC-5, andrew...@gmail.com wrote:
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> 2457662.9236841439
> IDL> caldat,jd,mon,d,y,h,m,s
> % Compiled module: CALDAT.
> IDL> print,y,mon,d,h,m,s
> 2016 10 1 10 10 6.3100353
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> CALDAT C:\Program Files\Exelis\IDL85\lib\caldat.pro
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> JULDAY C:\Program Files\Exelis\IDL85\lib\julday.pro
>
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