Subject: Re: JULDAY-CALDAT problem
Posted by David Fanning on Thu, 26 Feb 2004 14:19:10 GMT
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Luciano writes:

> Hi, maybe somebody has a clue about the following:
>
> IDL> aa=JulDay(11,18,1990,2,0,0)
> IDL> Caldat,aa,m,d,y,h,mi,s
> IDL> print,m,d,y,h,mi,s
> 11 18 1990 2 0 5.3644181e-005
>
> Why does s=5.3644181e-005 and not s=0 as it should be?

I think it is a question of using a computer to do the
calculations rather than your fingers. :-)

Floating point numbers have about 7 significant figures.
Assuming 60 seconds in a minute, this number starts to
vary in the seventh place. So, about as close to zero
as you gonna get, I think.

For a more complete explanation, see this article:

  http://www.dfanning.com/math_tips/sky_is_falling.html

Cheers,

David

--
David Fanning, Ph.D.
Fanning Software Consulting
Coyote's Guide to IDL Programming: http://www.dfanning.com/

Subject: Re: JULDAY-CALDAT problem
Posted by btupper on Thu, 26 Feb 2004 14:52:37 GMT
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On Thu, 26 Feb 2004 07:19:10 -0700, David Fanning <david@dfanning.com>
wrote:

> Luciano writes:
>
>> Hi, maybe somebody has a clue about the following:
>>

>> IDL> aa=JulDay(11,18,1990,2,0,0)
>> IDL> Caldat,aa,m,d,y,h,mi,s
>> IDL> print,m,d,y,h,mi,s
>> 11 18 1990 2 0 5.3644181e-005
>>
>> Why does s=5.3644181e-005 and not s=0 as it should be?
>
> I think it is a question of using a computer to do the
> calculations rather than your fingers. :-)
>
> Floating point numbers have about 7 significant figures.
> Assuming 60 seconds in a minute, this number starts to
> vary in the seventh place. So, about as close to zero
> as you gonna get, I think.
>
> For a more complete explanation, see this article:
>
> http://www.dfanning.com/math_tips/sky_is_falling.html
>

Hello,

One additional thing to add to David's explanation is that JULDAY adds a small offset to the seconds argument. I forget why, but the reason is described in the documentation for JULDAY. You could test it out by editing the JULDAY function so it does not add the offset. I'll bet you still will not get the answer you expect because of the condition David describes.

Ben

Subject: Re: JULDAY-CALDAT problem
Posted by David Fanning on Thu, 26 Feb 2004 15:22:36 GMT
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Ben Tupper writes:

> One additional thing to add to David's explanation is that JULDAY adds
> a small offset to the seconds argument. I forget why, but the reason
> is described in the documentation for JULDAY. You could test it out
> by editing the JULDAY function so it does not add the offset. I'll
> bet you still will not get the answer you expect because of the
> condition David describes.

Thank you, Ben. And also for that tip on the Bigelow Arctic expedition. Looks like I might be spending a couple of weeks wandering the ice on the Beaufort Sea. :-)

Cheers,

David
--
David Fanning, Ph.D.
Fanning Software Consulting
Coyote's Guide to IDL Programming: http://www.dfanning.com/

Subject: Re: JULDAY-CALDAT problem
Posted by btupper on Thu, 26 Feb 2004 16:17:47 GMT
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On Thu, 26 Feb 2004 08:22:36 -0700, David Fanning <david@dfanning.com>
wrote:

> Ben Tupper writes:
>
>> One additional thing to add to David's explanation is that JULDAY adds
>> a small offset to the seconds argument. I forget why, but the reason
>> is described in the documentation for JULDAY. You could test it out
>> by editing the JULDAY function so it does not add the offset. I'll
>> bet you still will not get the answer you expect because of the
>> condition David describes.
>
> Thank you, Ben. And also for that tip on the Bigelow
> Arctic expedition. Looks like I might be spending a
> couple of weeks wandering the ice on the Beaufort Sea. :-)
>

Hey that sounds like fun. You *must must must* read "Arctic Dreams"
before you go. That description the walrus leaping out of the water
to squash people standing on the edge of a floe was riveting. I was
asked about you and I related how your backhand is quite famous on the
newsgroup. That seemed to clinch it.

Bon voyage!

Ben

Subject: Re: JULDAY-CALDAT problem
Posted by David Fanning on Thu, 26 Feb 2004 16:41:58 GMT
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Ben Tupper writes:

> Hey that sounds like fun. You *must must must* read "Arctic Dreams"
> before you go. That description the walrus leaping out of the water
> to squash people standing on the edge of a floe was riveting. I was
> asked about you and I related how your backhand is quite famous on the
> newsgroup. That seemed to clinch it.

Arctic Dreams is my all-time favorite book. I was thinking when
I got up this morning that I would get a new copy. Mine is too
raggedy from use to survive the trip. It's a funny book, though.
It takes me *months* to read it. The essays are so perfect, and
so beautiful, that I can't go onto the next one without savoring
the one I just read for weeks at a time. :-)

Order it here:

http://tinyurl.com/3cprp

Cheers,

David
--
David Fanning, Ph.D.
Fanning Software Consulting
Coyote's Guide to IDL Programming: http://www.dfanning.com/

Subject: Re: JULDAY-CALDAT problem
Posted by David Fanning on Thu, 26 Feb 2004 16:51:11 GMT
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David Fanning writes:

> I was asked about you and I related how your backhand is quite
> famous on the newsgroup. That seemed to clinch it.

Do you think I should bring my rackets? 20 below
doesn't seem like it's *that* cold! :-)

Cheers,

David

--
David Fanning, Ph.D.
Fanning Software Consulting
Coyote's Guide to IDL Programming: http://www.dfanning.com/

Subject: Re: JULDAY-CALDAT problem
Posted by lucianor on Fri, 27 Feb 2004 10:30:45 GMT
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Thanks David and Ben for your help. I've solved the problem by not using Julday and Caldat...
David, if for the computer 0=10^-5 then is not me who has to start counting like a computer, it should be the other way around :)

This is simply wrong and should be fixed at some level! I understand all the hardware, 0s and 1s, significant figures and related problems described in your "Help! The Sky is Falling!" section. But... don't you think this should be fixed somehow?

If you ask me, 0 should be 0, and the computer should be able to know it...

Luciano

Subject: Re: JULDAY-CALDAT problem
Posted by David Fanning on Fri, 27 Feb 2004 13:28:24 GMT
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Luciano writes:

> This is simply wrong and should be fixed at some level! I understand
> all the hardware, 0s and 1s, significant figures and related problems
> described in your "Help! The Sky is Falling!" section. But... don't
> you think this should be fixed somehow?

I don't know. If you can throw a couple of tons of machine
at Mars and hit your target within a couple of hundred feet,
you are probably close enough. :-)

Cheers,

David

P.S. Let's just say I presume when we all have 64-bit processors
in our computers that numbers will get a LOT more accurate
than they are now.

--
David Fanning, Ph.D.
Fanning Software Consulting
Coyote's Guide to IDL Programming: http://www.dfanning.com/

Subject: Re: JULDAY-CALDAT problem
Posted by Paul Van Delst[1] on Fri, 27 Feb 2004 16:06:57 GMT
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Luciano wrote:
>
> Thanks David and Ben for your help. I've solved the problem by not
> using Julday and Caldat...
> David, if for the computer 0=10^-5 then is not me who has to start
> counting like a computer, it should be the other way around :)
>
> This is simply wrong and should be fixed at some level! I understand
> all the hardware, 0s and 1s, significant figures and related problems
> described in your "Help! The Sky is Falling!" section. But... don't
> you think this should be fixed somehow?
>
> If you ask me, 0 should be 0, and the computer should be able to know
> it...

0 is 0 on a computer. A number like 0.0 can, typically, be represented exactly. Same goes for numbers like 1.0 or 2.0. When you start using 0.1's or 3.1415927's things get sticky. And, when you start repeatedly adding and subtracting the sticky numbers that *can't* be represented exactly, then the numeric precision issues crop up.

Having said all that, I hear you. It would be nice if the way we thought about these sorts of problems was also how a computer handles them. When confronted with this sort of situation, e.g. "the computer should be able to know", I just remember that a computer has zero (exactly :o) intelligence. All the know-how and mistakes come from us.

cheers,

paulv

--
Paul van Delst
CIMSS @ NOAA/NCEP/EMC

Subject: Re: JULDAY-CALDAT problem
Posted by James Kuyper on Fri, 27 Feb 2004 16:17:39 GMT
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Luciano wrote:
>
> Thanks David and Ben for your help. I've solved the problem by not
> using Julday and Caldat...
> David, if for the computer 0=10^-5 then is not me who has to start
> counting like a computer, it should be the other way around :)

>
> This is simply wrong and should be fixed at some level! I understand
> all the hardware, 0s and 1s, significant figures and related problems
> described in your "Help! The Sky is Falling!" section. But... don't
> you think this should be fixed somehow?
>
> If you ask me, 0 should be 0, and the computer should be able to know
> it...

There are ways to achieve that - they basically involve storing and manipulation all the components of dates as integers, rather than floating point. As long as floating point numbers are used, inaccuracy is unavoidable, since you can't represent all the real numbers in a finite non-zero range, using a representation that takes up a fixed maximum about of memory.

Subject: Re: JULDAY-CALDAT problem
Posted by Mark Hadfield on Sun, 29 Feb 2004 22:50:07 GMT
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David Fanning wrote:
> David Fanning writes:
>
>
>> I was asked about you and I related how your backhand is quite
>> famous on the newsgroup. That seemed to clinch it.
>
>
> Do you think I should bring my rackets? 20 below
> doesn't seem like it's *that* cold! :-)

Come on guys. I was reading an enthralling thread on JULDAY & CALDAT and you drift off into Antarctica, or Arctica, somewhere cold anyway.

JULDAY and CALDAT are much more interesting.

--
Mark Hadfield "Ka puwaha te tai nei, Hoea tatou"
m.hadfield@niwa.co.nz
National Institute for Water and Atmospheric Research (NIWA)
