Subject: Re: SIGN function: signof(num or array of num)
Posted by H. Evans on Tue, 16 Mar 2010 14:30:07 GMT
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On Mar 16, 2:57 pm, Carsten Lechte <c...@toppoint.de> wrote:
> F LDY Lajos wrote:
>> I think SIGNOF() should not cause an arithmetic error for finite numbers.
>
> I use the expression
>
> (x GT 0) -1* (x LT 0)
>
> to get the sign of e.g.
>
> x = [-2e4, 5, 0, 1d/0, -1d/0, 0d/0]
>
> but it uses 2 comparisons and even a multiplication. Does anyone have
> a simpler/faster version? Furthermore, what should the sign of NaN be?
>
> chl

Could be either + or -ve:
IDL> print,!values.f_nan, - !values.f_nan
NaN -NaN

Subject: Re: SIGN function: signof(num or array of num)
Posted by Ding on Tue, 16 Mar 2010 15:32:06 GMT
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On Mar 16, 1:31 pm, FÖLDY Lajos <fo...@rmki.kfki.hu> wrote:
> On Tue, 16 Mar 2010, Ding wrote:
>> Dear IDL users,
>
>> I cannot find the SIGN function in IDL procedures, but one in
>> Solarsoft ssw/maths/ SIGN which occupy the name, but different
>> purpose(sign(a)*b). so I wrote the SIGNOF() function which is to get
>> the sign of a number or array,
>
>> Hopefully I am not repeating someone' work! you are welcome to
>> comments!
>
>> return, fix(abs(input)/input)
>
> IDL> input=0 & help, fix(abs(input)/input)
> <Expression> INT = 0
> % Program caused arithmetic error: Integer divide by 0
>

> I think SIGNOF() should not cause an arithmetic error for finite numbers.
>
> regards,
> lajos

This is expected in my algorithm, as the sign of 0 is considered to be 0. although there is an error in the IDL language, however 0/0=0, is still true. the power of this in array calculation

```
IDL> a=[[1,0][-1,0]]
IDL> print,signof(a)
     1  0
    -1  0
```

Ding Yuan

Subject: Re: SIGN function: signof(num or array of num)
Posted by Carsten Lechte on Tue, 16 Mar 2010 15:35:58 GMT
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H. Evans wrote:
> Could be either + or -ve:
> IDL> print,!values.f_nan, - !values.f_nan
>   NaN   -NaN

Then, a totally different approach might be necessary to get it completely right.

FINITE() tells you if you have a NaN, but since every comparison that involves NaNs evaluates to FALSE, you cannot find out if it's + or -NaN be equating to !VALUES.F_NAN.

One would have to extract the sign bit (assuming IEEE format, taking into account endianness, precision etc.) and base the calculation on that.

For my private version, I will add a term + (FINITE(x) EQ 0) so all NaNs are assumed positive, since the one value that SIGNUM(NaN) should not have is 0.

I wonder in what situation one would care about the correct sign of something that is not a number.

chl

Subject: Re: SIGN function: signof(num or array of num)
Posted by Ding on Tue, 16 Mar 2010 15:43:49 GMT
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On Mar 16, 10:51 am, Ding <gardener_2...@hotmail.com> wrote:
> Dear IDL users,
>
> I cannot find the SIGN function in IDL procedures, but one in
> Solarsoft ssw/maths/ SIGN which occupy the name, but different
> purpose(sign(a)*b). so I wrote the SIGNOF() function which is to get
> the sign of a number or array,
>
> Hopefully I am not repeating someone' work! you are welcome to
> comments!
>
> ; return the sign of the input data in an array of the same size
> ; -1 for negative elements
> ; 1 for positive elements
> ; 0 for 0 and complex number
> ; only works for numerics

return the sign of the input data in an array of the same size
-1 for negative elements
1 for positive elements
0 for 0 and complex number
only works for numerics
>a=[[1,-2],[0,3]]
> print, signof(a)
1 -1
0 1
>
More notes:

although signof(0) cause algorithm error, since 0/0 is defined as 0,
signof(0)=0, signof(Inf)=0. it can be used in an expression
signof(numeric variable or array)*10.0/5. etc.

Subject: Re: SIGN function: signof(num or array of num)
Posted by Carsten Lechte on Tue, 16 Mar 2010 15:46:34 GMT
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Ding wrote:
> IDL> a=[[1,0][-1,0]]
> IDL> print,signof(a)
> 1 0
> -1 0

Still, you should mention under RESTRICTIONS that the
input must be an integer type:

```
IDL> a=[[1,0],[-1,0]]
IDL> print, signof(a)
       1       0
      -1       0
% Program caused arithmetic error: Integer divide by 0
IDL> print, signof(double(a))
       1  -32768
      -1  -32768
% Program caused arithmetic error: Floating illegal operand
IDL> print, signof(complex(a))
       1  -32768
      -1  -32768
% Program caused arithmetic error: Floating illegal operand
```

chl

Subject: Re: SIGN function: signof(num or array of num)
Posted by Ding on Tue, 16 Mar 2010 16:17:54 GMT
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On Mar 16, 3:46 pm, Carsten Lechte <c...@toppoint.de> wrote:
> Ding wrote:
>> IDL> a=[[1,0][-1,0]]
>> IDL> print,signof(a)
>>   1 0
>>   -1 0
>
> Still, you should mention under RESTRICTIONS that the
> input must be an integer type:
>
> IDL> a=[[1,0],[-1,0]]
> IDL> print, signof(a)
>   1   0
>   -1   0
> % Program caused arithmetic error: Integer divide by 0
> IDL> print, signof(double(a))
>   1 -32768
>   -1 -32768
> % Program caused arithmetic error: Floating illegal operand
> IDL> print, signof(complex(a))
>   1 -32768
>   -1 -32768
> % Program caused arithmetic error: Floating illegal operand

>
> chl

This is all the information I have, including the !version:

```
IDL> print,!version
{ x86_64 linux unix linux 6.4 Apr 26 2007      64      64}
IDL> print,a
      1       0
     -1       0
IDL> print,double(a)
      1.0000000       0.0000000
     -1.0000000       0.0000000
IDL> print,complex(a)
(      1.00000,      0.00000)(      0.00000,      0.00000)
(     -1.00000,      0.00000)(      0.00000,      0.00000)
IDL> print,signof(a)
      1       0
     -1       0
% Program caused arithmetic error: Integer divide by 0
IDL> print,signof(double(a))
      1       0
     -1       0
% Program caused arithmetic error: Floating illegal operand
IDL> print,signof(complex(a))
      1       0
     -1       0
% Program caused arithmetic error: Floating illegal operand
IDL>
```

Let's compare the version of the result and see if it is IDL or
processor that cause the difference!

Subject: Re: SIGN function: signof(num or array of num)
Posted by Carsten Lechte on Tue, 16 Mar 2010 16:25:45 GMT
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Ding wrote:

> IDL> print,!version
> { x86_64 linux unix linux 6.4 Apr 26 2007   64   64}

Mine is:
  { x86   linux unix linux 6.4 Apr 26 2007   32   64}
and I confirmed your results on a 64bit machine.

chl

Subject: Re: SIGN function: signof(num or array of num)
Posted by Carsten Lechte on Tue, 16 Mar 2010 16:36:54 GMT
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I wrote:
> One would have to extract the sign bit (assuming IEEE format,
> taking into account endianness, precision etc.) and base the
> calculation on that.

Alternatively, one could read the documentation and discover the
SIGN keyword to the FINITE() function ;-)

chl

Subject: Re: SIGN function: signof(num or array of num)
Posted by Foldy Lajos on Tue, 16 Mar 2010 16:41:33 GMT
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On Tue, 16 Mar 2010, Ding wrote:

> although signof(0) cause algorithm error, since 0/0 is defined as 0,
> signof(0)=0, signof(Inf)=0. it can be used in an expression
> signof(numeric variable or array)*10.0/5. etc.

0/0 is undefined in mathematics.

regards,
lajos
