
Subject: matrix division

Posted by [adam.ranson](#) on Wed, 21 May 2008 18:29:12 GMT

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Hi,

I have a question about IDL 5.6 which I'm pretty new to... I seem to remember having a similar problem in MatLab a while back too. I'm trying to divide each of the elements in a 2D array by the elements in 2nd 2D array of identical dimensions and put the result into 3rd array. Is it possible to do this in one statement in IDL or do I have to go through each item using a loop?

Many thanks for any help anyone can offer!

Adam

Subject: Re: matrix division

Posted by [David Fanning](#) on Thu, 22 May 2008 15:48:10 GMT

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jameskuyper@verizon.net writes:

> For the integer case:
>
> ratio = numerator/denominator
> bad = WHERE(denominator eq 0, count)
> IF count gt 0 THEN ratio[bad] = replacement_value
>
> replacement_value needs to be carefully chose for the context of your
> problem. You might want to give different replacement values depending
> upon whether the numerator is positive, negative, or 0. There's
> probably a more elegant approach, but three different WHERE's would
> certainly be sufficient to cover those cases.
>
> For the floating point case, IDL fills in the relevant elements of
> ratio with -Inf, Nan, or Inf, depending upon the sign of the
> numerator, and I can't think of any better way of handling it than to
> use precisely those value. If you need to use your result for further
> computations where those values would be unacceptable, replace them,
> with logic similar to the above, but using the FINITE() function.

Shoot. I was hoping for an elegant solution. :-(

Cheers,

David

--

David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming (www.dfanning.com)
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: matrix division
Posted by [Paul Van Delst\[1\]](#) on Thu, 22 May 2008 16:19:57 GMT
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David Fanning wrote:

> jameskuyper@verizon.net writes:

>

>> For the integer case:

>>

>> ratio = numerator/denominator

>> bad = WHERE(denominator eq 0, count)

>> IF count gt 0 THEN ratio[bad] = replacement_value

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>> problem. You might want to give different replacement values depending
>> upon whether the numerator is positive, negative, or 0. There's
>> probably a more elegant approach, but three different WHERE's would
>> certainly be sufficient to cover those cases.

>>

>> For the floating point case, IDL fills in the relevant elements of
>> ratio with -Inf, Nan, or Inf, depending upon the sign of the
>> numerator, and I can't think of any better way of handling it than to
>> use precisely those value. If you need to use your result for further
>> computations where those values would be unacceptable, replace them,
>> with logic similar to the above, but using the FINITE() function.

>

> Shoot. I was hoping for an elegant solution. :-(

For something like this, the Fortran WHERE construct is teeny bit more elegant, e.g.

```
real, dimension(100,100) :: ratio, numerator, denominator
```

```
....
```

```
where (abs(denominator) > 0.0)
```

```
  ratio = numerator/denominator
```

```
elsewhere
```

```
  ratio = -999.9
```

```
end where
```

I like the fact that I don't have to explicitly use any indices indicated where good or bad values are.

Anyway....

cheers,

paulv

Subject: Re: matrix division

Posted by edward.s.meinel@aero on Thu, 22 May 2008 16:47:46 GMT

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On May 22, 11:48 am, David Fanning <n...@dfanning.com> wrote:

>

> Shoot. I was hoping for an elegant solution. :-(

>

> Cheers,

>

> David

>

David, David, David...

This will be about the fourth or fifth time I've posted the elegant solution. Put it on your site already!

$c = a / (b + \text{replacement_value} * (b \text{ EQ } 0))$

Ed

PS: That would be soooooo cool to be referenced by Coyote!

PPS: David, why no more PS-ing in your posts? I miss them.

Subject: Re: matrix division

Posted by [Rich Younger](mailto:Rich.Younger) on Thu, 22 May 2008 17:13:51 GMT

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edward.s.meinel@aero.org wrote:

> On May 22, 11:48 am, David Fanning <n...@dfanning.com> wrote:

>> Shoot. I was hoping for an elegant solution. :-(

>>

>> Cheers,

>>

>> David

>>

> David, David, David...

>
> This will be about the fourth or fifth time I've posted the elegant
> solution. Put it on your site already!
>
> $c = a/(b + \text{replacement_value}*(b \text{ EQ } 0))$
>
> Ed
>
> PS: That would be soooooo cool to be referenced by Coyote!
>
> PPS: David, why no more PS-ing in your posts? I miss them.

$c = a/(b \text{ EQ } 0 ? \text{replacement_value} : b)$ doesn't require an extra multiplication.

Rich

Subject: Re: matrix division
Posted by [Rich Younger](#) on Thu, 22 May 2008 17:22:01 GMT
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Rich Younger wrote:

> edward.s.meinel@aero.org wrote:
>> On May 22, 11:48 am, David Fanning <n...@dfanning.com> wrote:
>>> Shoot. I was hoping for an elegant solution. :-(
>>>
>>> Cheers,
>>>
>>> David
>>>
>> David, David, David...
>>
>> This will be about the fourth or fifth time I've posted the elegant
>> solution. Put it on your site already!
>>
>> $c = a/(b + \text{replacement_value}*(b \text{ EQ } 0))$
>>
>> Ed
>>
>> PS: That would be soooooo cool to be referenced by Coyote!
>>
>> PPS: David, why no more PS-ing in your posts? I miss them.
>
> $c = a/(b \text{ EQ } 0 ? \text{replacement_value} : b)$ doesn't require an extra
> multiplication.
>
> Rich

... but isn't valid for vectors.

Never mind.

Rich

Subject: Re: matrix division
Posted by [David Fanning](#) on Thu, 22 May 2008 17:45:18 GMT
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edward.s.meinel@aero.org writes:

> David, David, David...
>
> This will be about the fourth or fifth time I've posted the elegant
> solution. Put it on your site already!
>
> $c = a / (b + \text{replacement_value} * (b \text{ EQ } 0))$

Yeah, I'm *definitely* writing this down, right now!

But, what about floats? :-)

> PPS: David, why no more PS-ing in your posts? I miss them.

I've been trying to present a more professional demeanor. :-(

Cheers,

David

P.S. Let's just say, with the IDL Workbench and further set-backs in athletic ability due to old age, my cynicism is getting out of control. :-(

--
David Fanning, Ph.D.
Fanning Software Consulting, Inc.
Coyote's Guide to IDL Programming (www.dfanning.com)
Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: matrix division
Posted by [Jean H.](#) on Thu, 22 May 2008 19:28:00 GMT
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>> c = a/(b + replacement_value*(b EQ 0))
>
> Yeah, I'm *definitely* writing this down, right now!
>
> But, what about floats? :-)

c = a/(b + replacement_value*(abs(b) lt epsilon))

Jean

Subject: Re: matrix division
Posted by [Kenneth P. Bowman](#) on Thu, 22 May 2008 20:15:08 GMT
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In article <g14hfu\$fl3\$1@news.ucalgary.ca>,
Jean H <jghasban@DELTHIS.ucalgary.ANDTHIS.ca> wrote:

>>> c = a/(b + replacement_value*(b EQ 0))
>>
>> Yeah, I'm *definitely* writing this down, right now!
>>
>> But, what about floats? :-)
>
>
> c = a/(b + replacement_value*(abs(b) lt epsilon))
>
> Jean

All of these variations are clever, and I can see why you might want to do this in special circumstances, but usually when I divide by zero, I want to know about. A floating-point exception and Inf work for me.

Cheers, Ken

Subject: Re: matrix division
Posted by [adam.ranson](#) on Fri, 23 May 2008 08:47:05 GMT
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Thanks for the help everyone. I'll go try again now.

Cheers

Adam

Subject: Re: matrix division

Posted by edward.s.meinel@aero on Fri, 23 May 2008 15:13:46 GMT

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On May 22, 4:15 pm, "Kenneth P. Bowman" <k-bow...@null.edu> wrote:

>
> All of these variations are clever, and I can see why you might
> want to do this in special circumstances, but usually when I
> divide by zero, I want to know about. A floating-point exception
> and Inf work for me.
>
> Cheers, Ken

Exactamundo, Ken. This provides the user with a choice -- if the user wants to know about the zero-divide, just do $c=a/b$; if there are known special cases, use the clever solution.

In article <g14hfu\$fl...@news.ucalgary.ca>, Jean H <jghas...@DELTHIS.ucalgary.ANDTHIS.ca> wrote:

> $c = a/(b + \text{replacement_value} * (\text{abs}(b) \text{ lt } \text{epsilon}))$

Ooooo, good one, Jean.

David Fanning <n...@dfanning.com> wrote:

> I've been trying to present a more professional demeanor. :-(

Nooooooooooooo!!!

Ed

P.S. So, David, does that mean that de older you are, demeanor you get?

Subject: Re: matrix division

Posted by [Jean H.](#) on Fri, 23 May 2008 16:41:23 GMT

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>> $c = a/(b + \text{replacement_value} * (\text{abs}(b) \text{ lt } \text{epsilon}))$
>
> Ooooo, good one, Jean.

on the other hand, doing this, when 'b' is 0, would lead to 'c = a / replacement_value'... so in 'c', you would get different results as 'a' varies..

Jean

Subject: Re: matrix division

Posted by [Vince Hradil](#) on Fri, 23 May 2008 17:06:39 GMT

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On May 23, 11:41 am, Jean H <jghas...@DELTHIS.ucalgary.ANDTHIS.ca> wrote:

```
>>> c = a/(b + replacement_value*(abs(b) lt epsilon))
```

```
>
```

```
>> Ooooo, good one, Jean.
```

```
>
```

```
> on the other hand, doing this, when 'b' is 0, would lead to 'c = a /
```

```
> replacement_value'... so in 'c', you would get different results as 'a'
```

```
> varies..
```

```
>
```

```
> Jean
```

Ummm... isn't that the idea?

Subject: Re: matrix division

Posted by [Jean H.](#) on Fri, 23 May 2008 17:23:27 GMT

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Vince Hradil wrote:

```
> On May 23, 11:41 am, Jean H <jghas...@DELTHIS.ucalgary.ANDTHIS.ca>
```

```
> wrote:
```

```
>>>> c = a/(b + replacement_value*(abs(b) lt epsilon))
```

```
>>> Ooooo, good one, Jean.
```

```
>> on the other hand, doing this, when 'b' is 0, would lead to 'c = a /
```

```
>> replacement_value'... so in 'c', you would get different results as 'a'
```

```
>> varies..
```

```
>>
```

```
>> Jean
```

```
>
```

```
> Ummm... isn't that the idea?
```

or is it to flag the bad entries? ... though having "inf" would do so very well:) ... nevermind then (that Friday rain is playing on my brain.. :)

Jean

Subject: Re: matrix division

Posted by [Vince Hradil](#) on Fri, 23 May 2008 18:02:21 GMT

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On May 23, 12:23 pm, Jean H <jghas...@DELTHIS.ucalgary.ANDTHIS.ca> wrote:

> Vince Hradil wrote:

>> On May 23, 11:41 am, Jean H <jghas...@DELTHIS.ucalgary.ANDTHIS.ca>
>> wrote:

>>>> > $c = a / (b + \text{replacement_value} * (\text{abs}(b) \text{ lt } \epsilon))$

>>>> Ooooo, good one, Jean.

>>> on the other hand, doing this, when 'b' is 0, would lead to 'c = a /

>>> replacement_value'... so in 'c', you would get different results as 'a'

>>> varies..

>

>>> Jean

>

>> Ummm... isn't that the idea?

>

> or is it to flag the bad entries? ... though having "inf" would do so

> very well:) ... nevermind then (that Friday rain is playing on my brain.. :)

>

> Jean

I see what you mean. Yes, there are two issues here - do you want to (quietly) avoid the divide-by-zero or do you want to flag them. Two issues and two different solutions.

Subject: Re: matrix division

Posted by [David Fanning](#) on Fri, 23 May 2008 19:18:02 GMT

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edward.s.meinel@aero.org writes:

> P.S. So, David, does that mean that de older you are, demeanor you
> get?

According to my wife. Apparently, I am not "aging gracefully".

Cheers,

David

--

David Fanning, Ph.D.

Fanning Software Consulting, Inc.

Coyote's Guide to IDL Programming: <http://www.dfanning.com/>

Sepore ma de ni thui. ("Perhaps thou speakest truth.")

Subject: Re: matrix division

Posted by [Kenneth P. Bowman](#) on Fri, 23 May 2008 20:41:07 GMT

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In article

<27c2f921-f4ce-4b62-96e5-9a9507dc378c@w1g2000prd.googlegroups.com>,

"edward.s.meinel@aero.org" <meinel@aero.org> wrote:

> On May 22, 4:15 pm, "Kenneth P. Bowman" <k-bow...@null.edu> wrote:

>>

>> All of these variations are clever, and I can see why you might

>> want to do this in special circumstances, but usually when I

>> divide by zero, I want to know about. A floating-point exception

>> and Inf work for me.

>>

>> Cheers, Ken

>

> Exactamundo, Ken. This provides the user with a choice -- if the user

> wants to know about the zero-divide, just do $c=a/b$; if there are known

> special cases, use the clever solution.

Right, people should not assume that this is the right thing to do in every case. I think in most cases users really want to generate a floating-point exception when they divide by zero.

Ken
