Subject: Re: arithmetic operation on array
Posted by David Fanning on Mon, 12 Aug 2013 21:24:07 GMT
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Phillip Miller writes:

> Possibly a dumb question, but I'm pretty new to IDL:
>
> I have a geographically explicit time-series with 456 time steps and a
> 1 degree resolution, so an array of dimensions 360 x 180 x 456, and I
> would like to recalculate it as the anomaly from the time-series
> average.
>
> I can calculate the time series average no problem
>
>> average = mean(data, dimension=3)
>
> But, of course, when I try
>
>> anomaly = data - mean(data, dimension=3)
>
> then I "lose" my third dimension, and end up with an array of 360 x
> 180, rather than what I want, which is an array that is the same size
> as my original.
>
> I know that I could loop it like
>
>> for i = 0,456 data[*,*,i] = data[*,*,i] - mean(data, dimension=3)
>
> but I feel like there must be a better way than making a for loop. Am
> I supposed to duplicate mean(data, dimension=3) times 456 in order to
> create an identically sized array for the minus operation? (i.e., an
> array with dimensions 360 x 180 x 456, but where each of the 456
> "slices" is identical)
>
> Thanks in advance for any suggestions!

The answer depends on how big your arrays are, how much on-board memory your machine has, and whether there is a coffee machine nearby. Personally, I wouldn't be worrying about optimizing your code until you discover there is a need to do so.

I wouldn't, however, use code like this:

```
for i = 0,456 data[*,*,i] = data[*,*,i] - mean(data, dimension=3)
```

This is guaranteed to be slow, because you are calculating the mean every time through the loop. Since that doesn't change, calculate it

once:

```
average = mean(data, dimension=3)
for i = 0,456 data[*,*,i] = data[*,*,i] - average
```

If you want to give it a try the IDL way, I would try something like this:

```
average = mean(data, dimension=3)
data = Temporary(data) - Rebin(average, 360, 180, 456)
```

You can time it by wrapping the code in the routines TIC and TOC. We would all be curious to see the results. :-)

Cheers,

David

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