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Subject: Re: tensor multiplication

Posted by [Paul van Delst](#) on Thu, 18 May 2000 07:00:00 GMT

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Daniel Luebbert wrote:

```
>
> Hi,
>
> does anybody out there know an efficient and elegant way (i.e., without
> for-loops)
> to implement a tensor multiplication in IDL?
>
> What I mean is this:
> IDL can do a matrix multiplication, e.g. if I do
>     c = indgen(3,4)
>     d = indgen(4)
> then for
>     help, c#d
> I get
>     LONG ARRAY[3],
> and that's what I expect.
>
> But now, when I take one more dimension, like
>     c = indgen(2,3,4)
>     d = indgen(4)
> then
>     help, c#d
> gives an error! (incompatible matrix dimensions...).
> What a would like to get is obviously an
>     ARRAY[2,3]
>
> Does anybody know how?
```

Great question! I have always only thought about 2D matrices, but why should nD be any different? Maybe when IDL says "matrix" is really means 2-D array?

how about

```
sz = size(c)
e = INTARR( sz(1), sz(2) )
FOR i = 0, sz(1) - 1 DO BEGIN
  tmp_e = REFORM( c[i,*,*] ) # d
  e[i,*] = TEMPORARY( tmp_e )
ENDFOR
```

I know it is not a great solution (I haven't tested it, just typed it) but something like this should work. If you encapsulate it in it's own

function, you would have a general tensor mult. method.

I'm sure the Gumley's, Fanning's, Markwardt's, and JD Smith's of the world will have more elegant answers.

paulv

p.s. Can someone explain to me the utility/need for having both the #  
\*and\* ## operator? I understand their operation but why both?  
Convenience? Performance?

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Paul van Delst            Ph: (301) 763-8000 x7274  
CIMSS @ NOAA/NCEP      Fax: (301) 763-8545  
Rm.202, 5200 Auth Rd.   Email: pvandelst@ncep.noaa.gov  
Camp Springs MD 20746

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