Subject: Re: Help with matrix operations
Posted by dan on Tue, 27 Apr 1993 08:33:49 GMT
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In article <1rk7gs$4m6@morrow.stanford.edu>, pln@egret0.Stanford.EDU (Patrick L. Nolan) writes:
|> I have a little matrix problem that I'm trying to do without using
|> loops. So far I'm not clever enough to figure out how to do it.
|> Suppose we have
|>   A = fltarr(N,N)
|>   B = fltarr(N)
|>   C = fltarr(N,N,N)
|> I want to have C(i,j,k) = A(i,j) + B(k)
|> for all i,j,k < N. Is there a way to do this without writing
|> ugly loops? I'm sure it's trivial, and I'll feel like a dope
|> when the first person points it out. Fire away.
|>
|> --
|> *   Patrick L. Nolan   (415)723-0133   *
|> *   W. W. Hansen Experimental Physics Laboratory (HEPL)   *
|> *   Stanford University   *
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How about

for k=1,n do c(*,*,k) = a(*,*) + b(k)

That has a loop but its not to ugly.

****
** Dan Bergmann   dbergmann@llnl.gov   **
****
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****
** Dan Bergmann   dbergmann@llnl.gov   **
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Subject: Re: Help with matrix operations
Posted by zawodny on Wed, 28 Apr 1993 11:47:13 GMT
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In article <1rk7gs$4m6@morrow.stanford.edu> pln@egret0.Stanford.EDU writes:
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Some one has suggested what may probably be the best (fastest) way to do this:

for k=0,n-1 do a(0,0,k) = a(*,*) * b(k) .

However there is a way to do this without loops. Let's take a more general
situation. Let

```
A = FLTARR(x,y)
B = FLTARR(z)
C = FLTARR(x,y,z)
```

to get C(i,j,k) = A(i,j) * b(k) do the following (make sure you are doing
integer math here).

```
; Make the indicies
 ma   = LINDGEN(x,y,z) mod (x*y)
 mb   = LINDGEN(x,y,z) / (x*y)
; define the destination array
 c    = fltarr(x,y,z)
; DO IT!
 c(*) = a(ma(*)) * b(mb(*))
```

That is all there is to it. I'll argue that you have done way too much math
this way then you would have done with the signle loop idea. Some may agrue
that the use of LINDGEN is an implicit loop. I won't argue with that either.

--
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Subject: Re: Help with matrix operations
Posted by thompson on Thu, 29 Apr 1993 14:48:33 GMT
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pln@egret0.Stanford.EDU (Patrick L. Nolan) writes:

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> loops. So far I'm not clever enough to figure out how to do it.
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> for all i,j,k < N. Is there a way to do this without writing
> ugly loops? I'm sure it's trivial, and I'll feel like a dope
> when the first person points it out. Fire away.

I don't think it's trivial. Here's how I would solve it.

```
;  First expand A and B out to NxNxN arrays.
;
AA = A(*) # REPLICATE(1,N) ;AA is now (N*N, N) array
AA = REFORM(AA,N,N,N)  ;Make it (N, N, N)
BB = REPLICATE(N*N) # B  ;Do the same for B
BB = REFORM(BB,N,N,N)
C = AA + BB
```

I don't know if this is any more or less "ugly" than doing it in a loop, but it should be much quicker. Of course you can combine all this into one command if you want.

Bill Thompson