
Subject: Can my big for loop exploit array operations?
Posted by [JTMHD](#) on Tue, 20 Oct 2015 12:35:07 GMT
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Hi,

I'm writing a little post-processing procedure and need help avoiding a hefty for loop, which will typically require 1000^3 iterations.

Its purpose is to take data from a simulation, which expresses three components of a vector field at a different position s.t.

x - component is defined on cell boundary in x-direction, cell center in other directions (xb,yc,zc)
y - component is defined on cell boundary in y-direction, cell center in other directions (xc,yb,zc)
z - component is defined on cell boundary in z-direction, cell center in other directions (xc,yc,zb)

and express the field as defined in the cell center for all components (xc,yc,zc).

Rather than using interpolation, I think the best way will be to simply average the values across the cell face to head off errors down the line.

The problem is im not sure how to avoid a hefty for loop which goes through all elements taking the desired average as follows....

```
FUNCTION reformat_bcomponents_1,t

data = getdata(t,/BX,/BY,/BZ,/GRID)

bx = DBLARR(SIZE(data.x,/N_ELEMENTS),SIZE(data.y,/N_ELEMENTS),SIZE(data.z,/N_ELEMENTS))
by = DBLARR(SIZE(data.x,/N_ELEMENTS),SIZE(data.y,/N_ELEMENTS),SIZE(data.z,/N_ELEMENTS))
bz = DBLARR(SIZE(data.x,/N_ELEMENTS),SIZE(data.y,/N_ELEMENTS),SIZE(data.z,/N_ELEMENTS))

FOR iz = 0,SIZE(data.z,/N_ELEMENTS) -1 DO BEGIN
FOR iy = 0,SIZE(data.y,/N_ELEMENTS) -1 DO BEGIN
FOR ix = 0,SIZE(data.x,/N_ELEMENTS) -1 DO BEGIN

  bx[ix,iy,iz] = MEAN( [ data.bx[ix,iy,iz], data.bx[ix+1,iy,iz] ] ,/DOUBLE)
  by[ix,iy,iz] = MEAN( [ data.by[ix,iy,iz], data.by[ix,iy+1,iz] ] ,/DOUBLE)
  bz[ix,iy,iz] = MEAN( [ data.bz[ix,iy,iz], data.bz[ix,iy,iz+1] ] ,/DOUBLE)

ENDFOR
ENDFOR
ENDFOR
```

```
mag_str = CREATE_STRUCT('bxp',bx,'byp',by,'bzp',bz)
```

```
RETURN,mag_str  
END
```

If anyone can point me in the direction of how to do this exploiting array operations I'd be grateful.

Thanks in advance,

Jonathan
