Subject: Re: partial derivatives of f(x,y)
Posted by bowman on Fri, 14 Apr 1995 07:00:00 GMT
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In article <3mmmpv$g0l@agate.berkeley.edu>,
korpela@albert.ssl.berkeley.edu (Eric J. Korpela) wrote:

> In article <D6xz1s.ADE@ireq.hydro.qc.ca>,
> <brooker@toka.ireq-ccfm.hydro.qc.ca> wrote:
>> I have a 2d function z=f(x,y). I need to calculate
>> the partial derivatives df/dx and df/dy for all the
>> grid points. Is there a routine for this somewhere?
>
> delta=some_small_number ;compared to the grid spacing
> dz_dx=(f(x+delta,y)-f(x-delta,y))/(2.0*delta)
> dz_dy=(f(x,y+delta)-f(x,y-delta))/(2.0*delta)

Perhaps he wanted:

```
z    = FLTARR(nx,ny)
dzdx = FLTARR(nx,ny)
dzdy = FLTARR(nx,ny)

FOR j = 0, ny-1 DO $
  dzdx(*,j) = (ROTATE(z(*,j),-1) - ROTATE(z(*,j),1))/(2.0*dx)
FOR j = 1, ny-2 DO $
  dzdy(*,j) = (z(*,j+1) - z(*,j-1))/(2.0*dy)
```

...then whatever you want to do for the normal derivatives on the boundaries...

You could do this without the ROTATE's by looping over i for dzdx, but
then you would access memory with a large stride. I think this will use
the cache much more efficiently on most workstations.

Regards, Ken Bowman

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