
Subject: partial derivatives of $f(x,y)$
Posted by [brooker](#) on Wed, 12 Apr 1995 07:00:00 GMT
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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?

Thanks-Peter Brooker

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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Subject: Re: partial derivatives of $f(x,y)$
Posted by [korpela](#) on Fri, 14 Apr 1995 07:00:00 GMT
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> grid points. Is there a routine for this somewhere?
>

Provided free of charge..... (Unless Unisys has patented it :))

Assuming x and y are arrays.....

$\text{delta} = \text{some_small_number}$;compared to the grid spacing
 $\text{dz_dx} = (f(x+\text{delta},y) - f(x-\text{delta},y)) / (2.0 * \text{delta})$
 $\text{dz_dy} = (f(x,y+\text{delta}) - f(x,y-\text{delta})) / (2.0 * \text{delta})$

Eric

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Eric Korpela | A day without meetings is like
korpela@ssl.berkeley.edu | work.

<http://www.cs.indiana.edu/finger/mofo.ssl.berkeley.edu/korpela/w>">Click here for more
info.
