Yes, that looks correct to compute left-sided difference derivatives. But a few comments:

1. You don't need the xc,yc vectors, just use the function directly

F_x = F[1:nx-1,*]-F[0:nx-2,*]

2.   You do not compute derivatives for the first column.   Be careful because your derivative array has one less column than the original function.

3.   Unless you need high compute speed, I would instead use the DERIV() function to obtain centered derivatives, with special treatment of the endpoints

F_x = fltarr(nx,ny)
for i=0,nx-1 do F_x[0,i] = $
   DERIV(F[*,i])

--Wayne

On Tuesday, June 27, 2017 at 6:30:59 AM UTC-4, geo...@gmail.com wrote:
> Hi there,
>
> I wanted to calculate numerical derivatives of a function. I would like to check if the following are correct.
>
> Consider the function F in R^2.
> F is a 2D image.
> I did the following:
> dims = size(F, /dimensions)
> nx = dims[0]
> ny = dims[1]
> xc = findgen(nx)
> yc = findgen(ny)
>
> Derivative with respect to x:
> F_x = F[xc[1:nx-1],*]-F[xc[0:nx-2],*] ;first order deriv
> F_xx = F_x[xc[1:nx-1],*]-F[xc[0:nx-2],*] ;second order deriv
> F_y = F[*,yc[1:ny-1]] - F[*,yc[0:ny-2]]
> F_xy = F_x[*,yc[1:ny-1]] - F_x[*,yc[0:ny-2]]
>
> Then I wanted to differentiate F_xy with respect to x. I did the following:
> F_xxy = F_xy[xind[1:nx-1],*] - F_xy[xind[0:nx-2],*]
>
> Are the above correct?
>

> Thanks.