Subject: Re: Function Maximum
Posted by Paul Van Delst[1] on Thu, 19 Jun 2003 21:06:46 GMT
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Kate wrote:
>
> If I have a function definition, say it is
>
> FUNCTION MYGAMMA, X, P
> RETURN, P[0]*(X^P[1])*EXP(-1*X/P[2])
> END
>
> Where P holds my fit parameters that are already determined.
>
> If I want to find a local maximum in a certain range is it possible to
> do this with an existing written IDL function?

How about something like:

```
maxY = MAX( mygamma(X,P) )
```

?

You already have your P's and your X's define the range in which the maximum is sought. If you need the X-value of the maximum, then

```
maxY = MAX( mygamma(X,P), maxXLoc )
maxX = X[maxXLoc]
```

If you don't want to carry around a bunch of X-vectors, then why not do something like:

```
FUNCTION FINDMAX, Xr, P, UserFunction
  X1 = DOUBLE(Xr[0])  ; The beginning of the range
  X2 = DOUBLE(Xr[1])  ; The end of the range
  dX = DOUBLE(Xr[2])  ; The resolution within the range

  ; Compute the ordinate vector
  nX = LONG( (X2-X1)/dX ) + 1.5d0 )
  X = ( DINDGEN( nX ) / DOUBLE( nX-1 ) ) * ( X2-X1 ) + X1

  ; Find the maximum value of your user function
  Y = CALL_FUNCTION( UserFunction, X, DOUBLE(P) )
  maxY = MAX( Y, maxXLoc )
  maxX = X[ maxXLoc ]

  ; Return the coordinate of the local max
  RETURN, [ maxX, maxY ]
```

```
END
```

where the Xr input defines the function range [x1,x2] and the resolution at which the function is calculated (Sort of like a loop triplet.)

Otherwise maybe you could use something like the FX_ROOT function to find the roots of the first derivative of your function (via DERIV or your own calculated derivative) and use the second derivative to determine if it's a max or min.

paulv

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