Subject: Patch #2 to userlib/deriv.pro to add MAX_VALUE keyword
Posted by rfinch on Tue, 04 Jan 1994 17:56:29 GMT

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Second try. First attempt didn't work for certain locations of where
the max values were. Maybe this will ;-)

This patch is for the original deriv.pro, NOT the previous patch.

```
*** deriv.pro 1994/01/04 17:46:55
--- deriv.pro~ 1993/12/24 15:29:48
**************
*** 1,6 ****
! ; $Id: deriv.pro,v 1.0 1993/12/24 15:29:48 rfinch Exp $

! Function Deriv, X, Y
  ;+
  ; NAME:
  ; DERIV
--- 1,6 ----
! ; $Id: deriv.pro,v 1.0.1.6 1994/01/04 17:46:55 rfinch Exp $

! Function Deriv, X, Y, max_value=max_value
  ;+
  ; NAME:
  ; DERIV
**************
*** 13,20 ****
  ; Numerical analysis.
  ;
  ; CALLING SEQUENCE:
! ; Dy = Deriv(Y)   ;Dy(i)/di, point spacing = 1.
! ; Dy = Deriv(X, Y) ;Dy/Dx, unequal point spacing.
  ;
  ; INPUTS:
  ; Y:  Variable to be differentiated.
--- 13,20 ----
  ; Numerical analysis.
  ;
  ; CALLING SEQUENCE:
! ; Dy = Deriv(Y, max_value=mv)   ;Dy(i)/di, point spacing = 1.
! ; Dy = Deriv(X, Y, max_value=mv)        ;Dy/Dx, unequal point spacing.
  ;
  ; INPUTS:
  ; Y:  Variable to be differentiated.
**************
*** 22,28 ****
  ;     spacing for Y (i.e., X(i) = i) is assumed.
```

```
  ;
  ; OPTIONAL INPUT PARAMETERS:
! ; As above.
  ;
  ; OUTPUTS:
  ; Returns the derivative.
--- 22,30 ----
  ;      spacing for Y (i.e., X(i) = i) is assumed.
  ;
  ; OPTIONAL INPUT PARAMETERS:
! ;max_value: Maximum value; original values greater than this and
! ;         their neighbors will be restored to the first large value
! ;         found, not the first derivative.
  ;
  ; OUTPUTS:
  ; Returns the derivative.
***************
*** 49,63 ****
--- 51,88 ----
  n = n_elements(x)
  if n lt 3 then message, 'Parameters must have at least 3 points'

+ count=0
  if n_params(0) ge 2 then begin
   if n ne n_elements(y) then message,'Vectors must have same size'
+        IF KEYWORD_SET(max_value) THEN BEGIN
+          mv_ndx = where(y GT max_value, count)
+          IF count GT 0 THEN BEGIN
+            big_value = y(mv_ndx(0))
+            mv_ndx=[mv_ndx-1, mv_ndx+1]
+            mv_ndx = mv_ndx(where(mv_ndx GT 0 AND mv_ndx LT n))
+            IF y(2) GT max_value THEN mv_ndx = [mv_ndx, 0]
+            IF y(n-3) GT max_value THEN mv_ndx = [mv_ndx, n-1]
+          ENDIF
+        ENDIF
   d = float(shift(y,-1) - shift(y,1))/(shift(x,-1) - shift(x,1))
   d(0) = (-3.0*y(0) + 4.0*y(1) - y(2))/(x(2)-x(0))
   d(n-1) = (3.*y(n-1) - 4.*y(n-2) + y(n-3))/(x(n-1)-x(n-3))
+        IF count GT 0 THEN d(mv_ndx) = big_value
     end else begin
+        IF KEYWORD_SET(max_value) THEN BEGIN
+          mv_ndx = where(x GT max_value, count)
+          IF count GT 0 THEN BEGIN
+            big_value = x(mv_ndx(0))
+            mv_ndx=[mv_ndx-1, mv_ndx+1]
+            mv_ndx = mv_ndx(where(mv_ndx GT 0 AND mv_ndx LT n))
+            IF x(2) GT max_value THEN mv_ndx = [mv_ndx, 0]
+            IF x(n-3) GT max_value THEN mv_ndx = [mv_ndx, n-1]
```

```
+        ENDIF
+        ENDIF
  d = (shift(x,-1) - shift(x,1))/2.
  d(0) = (-3.0*x(0) + 4.0*x(1) - x(2))/2.
  d(n-1) = (3.*x(n-1) - 4.*x(n-2) + x(n-3))/2.
+        IF count GT 0 THEN d(mv_ndx) = big_value
   endelse
  return, d
  end
```

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Any opinions expressed are my own; they do not represent the DWR